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### **THE IMPORTANCE OF QUALITY-OF-LIFE DIMENSIONS IN CITIZENS' PREFERENCES: AN EXPERIMENTAL APPLICATION OF CONJOINT**

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Filomena Maggino

# The importance of quality-of-life dimensions in citizens' preferences.

An experimental application  
of conjoint analysis



University of Florence

Part of this work was presented at the  
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Session  
**Community Quality of Life**

chaired by  
Don Rahtz – M. Joseph Sirgy

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## ***Introduction***

*One of the most interesting aims to be pursued in the context of the studies on the quality of the urban life concerns the investigation of the subjective importance (in terms of worth) that individuals attribute to the different aspects that define the domains of the community life.*

*Investigating the subjective worth through a direct inquiry, generally applying a rating scale, does not always allow reaching significant outcomes. The multivariate conjoint method can allow to overcome such difficulty and to understand how respondents develop their preferences.*

*The particular application presented here concerns the outcomes of an experimental application (in a group of students at the University of Florence, Italy) of such approach. Different domains of urban life were identified (social networks, urban environment, presence of public utilities, cultural environment); different attributes (factors) and different levels for each attribute were defined for each domain. The combination of the factors and the levels allowed constructing the stimuli (scenarios). The preferential choices, expressed by each respondent between the defined stimuli, allowed to estimate the subjective worth of both the factors and the levels, and to reveal the presence of different typologies among the respondents.*

## 1. CONJOINT ANALYSIS: BASICS

Conjoint analysis is a multivariate technique used specifically to understand how respondents develop preferences for products or services. It is based on the simple premise that consumers evaluate the value of a product/service/idea (real or hypothetical) by combining the separate amounts of value provided by each attribute.

Since the mid-1970', conjoint analysis has attracted considerable attention as a method that portrays consumers' decisions realistically as trade-offs among multiattribute products or services. Conjoint analysis gained widespread acceptance and use in many industries. During the 1990s, the application of conjoint analysis increased even further, spreading to many fields of study. Marketing's widespread utilization of conjoint in new product development for consumers led to its adoption in many other areas.

Coincident with this continued growth was the development of alternative methods of constructing the choice tasks for consumers and estimating the conjoint models.

Accelerated use of conjoint analysis has coincided with the widespread introduction of computer programs that integrate the entire process, from generating the combinations of independent variable values to be evaluated to creating choice simulators for predicting consumer choices across a wide number of alternative product and service formulations.

Conjoint analysis is best suited for understanding consumers' reactions to and evaluations of predetermined attribute combinations that represent potential products or services. While maintaining a high degree of realism, it provides the researcher with insight into the composition of consumer preferences.

*Utility* is the conceptual basis for measuring value in conjoint analysis.<sup>1</sup> It is a subjective judgment of preference unique to each individual. In conjoint analysis, utility is assumed to be based on the value placed on each of the values of the attributes and expressed in a relationship reflecting the manner in which the utility is formulated for any combination of attributes. We might sum the utility values associated with each feature of an object to arrive at an overall utility. Then we would assume that objects with higher utility values are more preferred and have a better chance of choice. Conjoint analysis is unique among multivariate methods in that the researcher first constructs a set of real or hypothetical objects by combining selected values of each attribute. These combinations are then presented to respondents, who provide only their overall evaluations. Thus, the researcher is asking the respondent to perform a very realistic task – choosing among a set of objects. Respondents need not tell the researcher anything else, such as how important an individual attribute is to them or how well the object performs on any specific attribute.

Because the researcher constructed the hypothetical objects in a specific manner, the influence of each attribute and each value of each attribute on the utility judgment of a respondent can be determined from the respondents' overall ratings.

To be successful, the researcher must be able to describe the object in terms of both its attributes and all relevant values for each attribute. The description of a specific attribute or other characteristic of the object is called *factor*. The possible values for each factor are called *levels*. So, an object is described in terms of *its levels on the set of factors characterizing it*.

---

<sup>1</sup> In order to simplify the presentation, from now on we refer the term "object" to mean a product, a service, an idea, and so on.

## ***1.1 Stages of the Analysis***

### ***1.1.1 The Objectives of Conjoint Analysis***

The main objective of conjoint analysis is studying individual decisions and preferences by:

- determining the contributions of predictor variables and their levels in the definition of individual preferences,
- establishing a valid model of individual judgments in order to predict individual acceptance of any combination of attributes, even those not initially evaluated by individuals.

These request the research question to be framed around two major issues:

- 1) *Defining the total utility of the object* (description of all the attributes that give utility or value to the object being studied).

In order to represent the respondent’s judgment process accurately, all attributes (positive and negative related to total utility) should be considered, because:

- a. focusing on only positive factors will seriously distort the respondents’ judgments,
- b. respondents can employ negative factors, even though not provided, and consequently render the experiment invalid.

- 2) *Specifying the Determinant Factors* (identifying the key decision criteria involved in the choice process for the type of object).

The goal is to include the factors that best differentiate between objects. Many attributes, even though considered important, may not differentiate in making choices because they do not vary substantially between objects.

### ***1.1.2 The design***

#### ***1.1.2.1 Selecting a Conjoint Analysis Methodology***

The choice of conjoint methodologies revolves around three basic characteristics of the proposed research: number of attributes handled, level of analysis and model form. On the basis of these characteristics three methodologies are identified:

Characteristic	Conjoint Methodology		
	Traditional	Adaptive	Choice-Based
Maximum number of attributes	9	30	6
Level of analysis	Individual	Individual	Aggregate
Model form	Additive	Additive	Additive+interaction effects

#### ***1.1.2.2 Designing Stimuli: the Selection and the Definition of the Factors and the Levels***

##### **Specification issues regarding factors**

In defining factors the researcher must address other specific issues:



- Measurement. The researcher should ensure that the measurement of factors is *communicable*, by using the appropriate expression (written, graphic, or other type of description), and *actionable* (factors must be distinct and represent a concept that can be precisely implemented: no fuzzy attributes).
- Number of factors: it directly affects the statistical efficiency and reliability of the results; the increased number of parameters to be estimated requires either a large number of stimuli or a reduction in the reliability of parameters. The minimum number of stimuli (*MNS*) that must be evaluated by a respondent (analysis at individual level) is
$$MNS = \text{total number of levels across all factors} - \text{number of factors} + 1$$
- Factor multicollinearity: the correlation among factors (*interattribute* or *environmental correlation*) denotes a lack of conceptual independence among the factors. Multicollinearity usually results in unbelievable combinations of two or more factors (unrealistic stimuli).

### Specification Issues Regarding Levels

In the definition of levels, a critical aspect of conjoint analysis because the levels are the actual measures used to form stimuli, the researcher must address other specific issues:

- Measurement. Levels must be easily communicated for a realistic evaluation (written, graphic or other type of description). Moreover, levels must be capable of being put into practice; particularly, levels should not be specified in imprecise terms (such as low, moderate or high) because of perceptual differences among individuals.
- Number of Levels. The number of levels should be balanced or equalized across factors; in this attempt the researcher must consider that the estimated relative importance of a variable increases as the number of levels increases; an unbalanced number of levels causes individuals to focus on one factor more than on others; moreover, an expanded number of levels causes a dilution of importance in the factor defined by those levels.
- Range of the Factors Levels: the range (low to high) of the levels should be set outside existing values but not at an unbelievable level. In other words, the levels should not be too extreme or unacceptable. Moreover, in defining the levels, the researcher must also apply the criteria of practical relevance and feasibility.

#### 1.1.2.3 Specifying the Basic Model Form

As told, the main goal of conjoint analysis is to explain the individual preference structure from overall evaluations of a set of stimuli.

In this perspective the researcher must take two decisions regarding:

- the design of stimuli,
- the analysis of respondent evaluations.

### The design of stimuli: the composition rule

In making decisions about decision rule, the researcher decides how factors relate to one another in the respondent's decision process. In particular, the composition rule describes how the respondent combines the part-worths of the factors to obtain overall worth. The choice of a composition rule determines the types and number of treatments or stimuli that the respondent must evaluate, along with the form of estimation method used. We can distinguish, principally, two kind of composition rule:

- *Additive Model*: it assumes that the respondent simply adds up the values for each attribute (part-worths) to get the total value for a combination of attributes (object). It is the basic model underlying both traditional and adaptive conjoint analysis. It requires fewer evaluations from the respondent and is easier to obtain estimates for the part-worths.

- *Adding Interaction Model*: it assumes that the respondent sums the part-worths to get an overall across the set of attributes (“the whole is greater, or less, than the sum of its part”). It allows for certain combinations of levels to be more or less than just their sum. It allows a more accurate representation of how respondents actually value an object.

### **The Analysis of Respondent Evaluations: Selecting the Part-Worth Relationship**

The researcher may make different type of assumption regarding the relationships of the part-worths within a factor. We can distinguish three different types of part-worth relationships:

- a) Linear Model: the simplest and most restrictive form; it estimates only a single part-worth (similar to a regression coefficient) which is multiplied by the level's value to arrive at separate part-worth values for each level.
- b) Quadratic (or Ideal) Model: it is described by a simple curvilinear (upward or downward) relationship.
- c) Separate Part-worth Model: it is the most general one, allowing for separate estimates for each level.

Mixture of forms of part-worth relationships can be defined by specifying different form for each factor separately. Approaches in selecting the part-worth relationship are:

- conceptual approach (which may rely on prior research),
- empirical approach (which visually examines and compares the part-worth model estimates to detect whether a linear or quadratic form is appropriate).

However in choosing the approach, the researcher must balanced predictive ability with the intended use of the study, and the conceptual background.

## **1.1.3 The Data Collection**

The objective is to convey to the respondent the attribute combinations (stimuli) in the most realistic and efficient manner possible. The stimuli may be presented in written descriptions (most often), by physical or pictorial models (for aesthetic or sensory attributes).

### **1.1.3.1 Choosing a Presentation Model**

The choice between presentation methods focused on the assumptions regarding the respondent preference process and the type of estimation process being employed. Three methods of stimuli presentation exist.

- The Trade-Off Presentation Method. It compares attributes two at time by ranking all combinations of levels.  
*Advantages*: simple for the respondent and easy to administer; it avoids information overload (by presenting only two attributes at a time).  
*Limitations*: it lacks in realism (by using only two factors at a time); it requires a large number of judgments; it makes respondent gets confused or follows a fixed response set; it makes difficult to use non-written (e.g. pictorial) stimuli; it allows only non-metric responses.
- The Full-Profile Presentation Method. Each stimulus is described separately; the respondent is asked to rank or to rate the stimuli.  
*Advantages*: it provides a realistic presentation (by defining a stimulus in terms of a level for each factor); it reduces the number of comparisons; it allows the use of more types of preference judgments.  
*Limitations*: information overload as the number of factors increases (recommended no more than 6 factors); the order of factor presentation may have an impact on the evaluation (need to rotate the factors in order to minimize order effects).

- The Pairwise Combination Presentation Method. It, combining the two other methods, is a comparison of two profiles, with the respondent using a rating scale to indicate strength of preference for one profile over the other. Only a few attributes at a time are selected in constructing profiles (the profile typically does not contain all the attributes). It allows the use of large number of attributes.

### 1.1.3.2 Creating the Stimuli

Each presentation method involves different kind of stimuli for evaluation of respondents.

In the *Trade-Off Presentation Method*, all possible combinations of attributes are used, defining a number of matrices. The number of trade-off matrices ( $M$ ) is based on the number of defined factors ( $m$ ):

$$M = \frac{m(m-1)}{2}$$

Each trade-off matrix involves a number of responses equal to the product of the factors' levels.

The *Full-Profile or Pairwise Combination Presentation Methods* involve the evaluation of one stimulus at a time (full-profile) or pairs of stimuli (pairwise comparison). With a small number of factors and levels, the respondent may evaluate all possible stimuli (Factorial Design: evaluation of all possible combinations). As the number of factors and levels increases, the design becomes impractical. In such cases, the fractional factorial design approach allows the definition of subset of the total stimuli that can be evaluated; it provides the information needed for making accurate and reliable part-worth estimates.

### 1.1.3.3 Selecting a Measure of Preference

Two are the shapes for a measure of preference:

- *Ranking*: ranking process is commonly performed by sorting stimuli into the preference order; it is more reliable because ranking is easier than rating with a reasonable small number of stimuli; it provides more flexibility in estimating different types of composition rules. It is difficult to administer especially with a large set of stimuli.
- *Rating*: rating process is commonly performed by assigning a judgment on a preference scale (generally rating from 0 to 10); it is easily analysed and administered; on the other hand, respondents can be less discriminating in their judgments than when they are rank-ordering. Given the large number of stimuli evaluated, it may be useful to expand the number of response categories over that found in most individual surveys.

The *trade-off* method allows only ranking data, the *pairwise comparison* method can evaluate preference either by obtaining a rating of preference of one stimulus over the other or just a binary measure of which is preferred. The *full-profile* method allows both ranking and rating methods.

### 1.1.3.4 Survey Administration

Many survey administration methods can be used (personal interviews, by telephone, by mail, by computer).

### 1.1.3.5 Statistical and Conceptual Assumptions

Conjoint analysis has few statistical assumptions but needs many assumptions regarding design,

estimation and interpretation.

The statistical tests for normality, homoscedasticity, and independence are not necessary. On the contrary the conceptual assumptions are greater:

- the researcher must specify the general form of the model (main effect vs. interactive model),
- the researcher must make decision concerning model form and must design the research accordingly.

### ***1.1.4 Estimating the Conjoint Model and Assessing the Overall Fit***

#### ***1.1.4.1 Selecting an Estimation Technique***

Rank-order evaluations require a modified form of analysis of variance specifically designed for ordinal data (Monotonic Analysis of Variance). If a metric measure of preference is obtained (e.g. ratings), then many methods, even multiple regression, can estimate the part-worths for each level.

#### ***1.1.4.2 Evaluating the Goodness-of-Fit of the Model***

The accuracy is assessed at both individual and aggregate levels, and for both metric and non-metric responses. The objective is to ascertain how coherently the model predicts the set of preference evaluations given by each person.

Rank-order data: correlations based on the actual and predicted ranks are used (Kendall's *tau* or Spearman's *rho*).

Metric data: simple Pearson correlation is appropriate along with a comparison of actual and predicted ranks.

Since the number of stimuli does not substantially exceed the number of parameters, and there is always the potential for "overfitting" the data, the researcher should measure model accuracy not only on the original stimuli but also with a set of *validation* or *holdout stimuli* (by a procedure similar to a holdout sample in discriminant analysis): the researcher prepares more stimuli that needed for estimation of the part-worths, and the respondent rates all of them at the same time; estimated parameters are then used to predict preference for the new set of stimuli.

### ***1.1.5 Interpreting the Results***

#### ***1.1.5.1 Level of the analysis***

Two interpretation levels are possible:

- *Disaggregate*: each respondent is modelled separately; the interpretation concerns the examination of the part-worth estimates for each factor, assessing their magnitude and pattern. The higher the part-worth value (positive or negative) is, the more impact it has on overall utility. Usually the part-worth values (converted on some common scale<sup>2</sup> to allow for comparison across factors, for an individual, and across individuals) are plotted in order to identify patterns.
- *Aggregate*: the analysis fits one model to the aggregate of the responses; unless the researcher

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<sup>2</sup> The conversion provides a means of using the part-worths in other multivariate techniques (such as cluster analysis).

is dealing with a population exhibiting homogeneous behaviour with respect to the factors, aggregate analysis should not be used as the only method of analysis.

In any case, the researcher must identify the primary purpose of the study and employ the appropriate level of analysis or a combination of the levels of analysis.

#### ***1.1.5.2 Assessing the Relative Importance of Attributes***

Conjoint analysis can assess the relative importance of each factor. The factor with the greatest range (low to high) of part-worths represents the greatest contribution to overall utility and hence the most important factor. The importance values of each factor can be converted to percentages dividing each factor's range by the sum of all range values. Value of an extreme or infeasible level should be deleted from the analysis or the importance values should be reduced to reflect only the range of feasible levels.

#### ***1.1.6 Validation of the Conjoint Results***

Conjoint results can be validated at two levels:

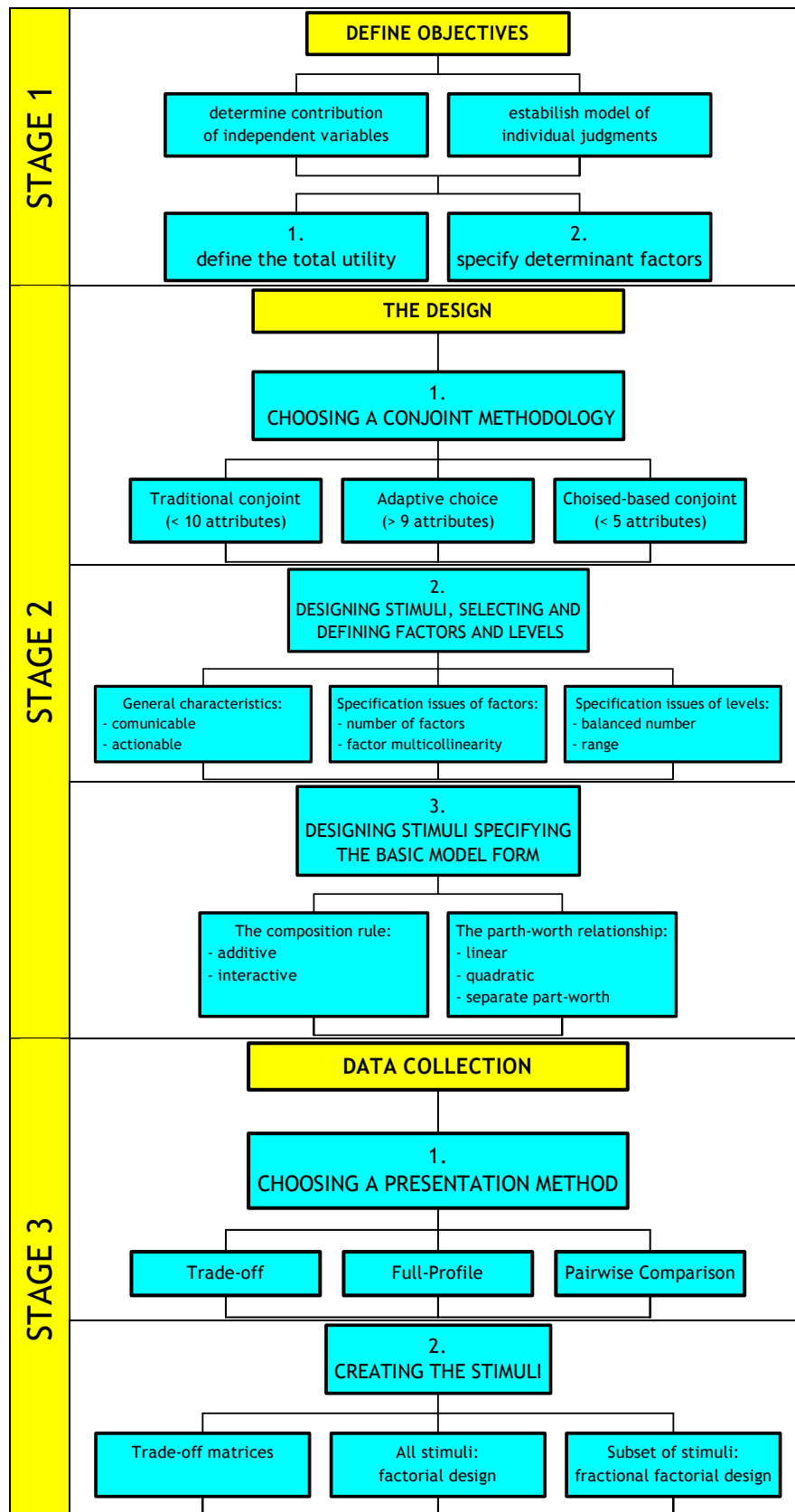
- *internal validation*, concerning the appropriateness of the selected composition rule (i.e., additive vs. interactive);
- *external validation*, concerning the ability of conjoint analysis to predict actual choices; however little research has focused on its true external validity.

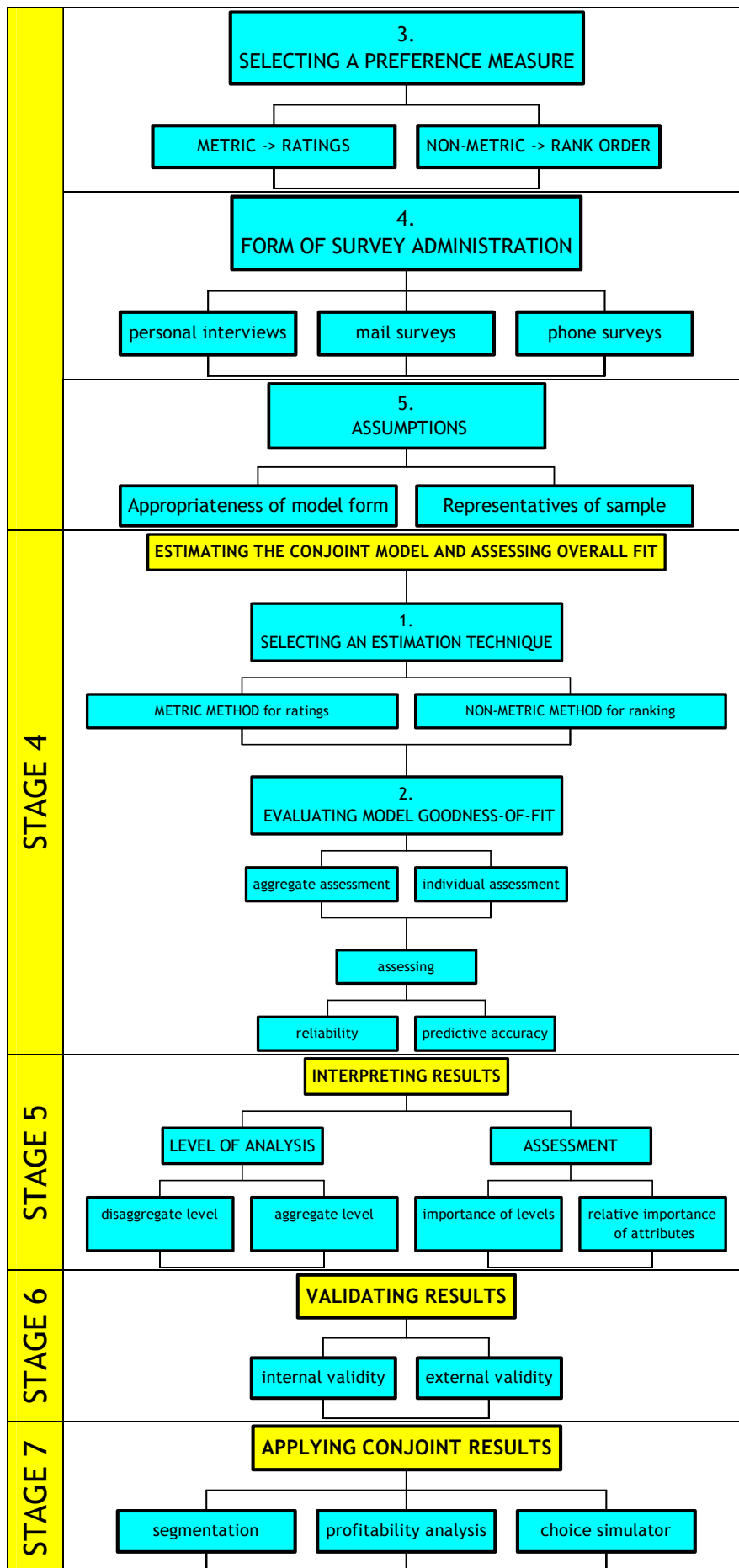
#### ***1.1.7 Applications of Conjoint Analysis***

Conjoint models estimated, at the individual or aggregate level, are used in one or more of the following areas of decision support:

- o **Segmentation**: it concerns grouping respondents with similar part-worths or importance values to identify segments. The grouping process, finalized to derive respondents groupings that are similar in their preferences, can be performed by using part-worths also in combination with other variables (e.g., demographics).
- o **Profitability analysis**: if the cost of each feature is known, the cost of each "product" can be combined with the expected market share and sales volume to predict its viability. Both individual and aggregate results can be used in this analysis.
- o **Conjoint simulators**: One of the primary objectives of the conjoint analysis is the prediction of the share of preferences that a stimulus is to capture in various competitive scenarios of interest to management. The objective can be reached by choice simulators, which follow a three-step process:
  1. estimate and validate conjoint models for each individual (or group),
  2. select the sets of stimuli to test according to possible competitive scenarios,
  3. simulate the choices of all respondents (or groups) for the specified sets of stimuli and predict share of preference for each stimulus by aggregating their choices.

Possible uses are assessing (1) the impact of adding a product to an existing market; (2) the increased potential from a multiproduct or multibrand strategy; (3) the impact of deleting a product or brand from the market.





## 2. THE APPLICATION

The application of the conjoin model presented here is part of a particular study which aims is the ascertainment and the validation of some scaling and measurement techniques applied in the quality of the life ambit and, in particular, in the subjective perception of the quality of the life in urban environment.

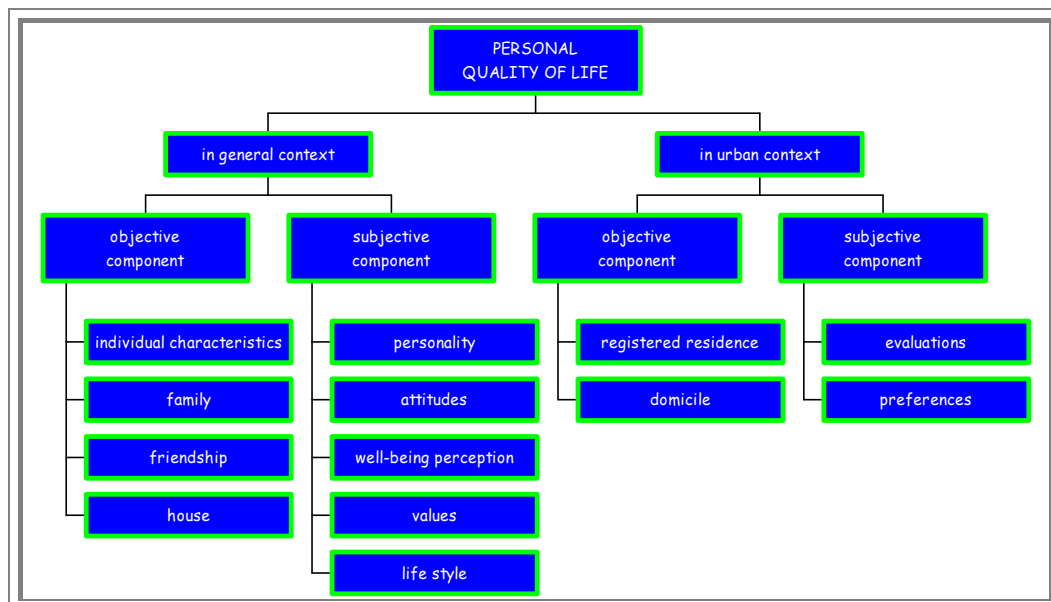
### 2.1 *Presentation of the study*

The measurement instrument and the experimental group were defined consistently with the aims and the ambit of application.

#### 2.1.1 *Identification of the investigation-areas, of the variables and of the items*

Two were the ambits identified for study of personal quality of life, the general quality of life and the specific quality of life connected to the urban environment. For each of the two ambits, two components were identified, one concerning “objective” conditions and the other regarding "subjective" perceptions.

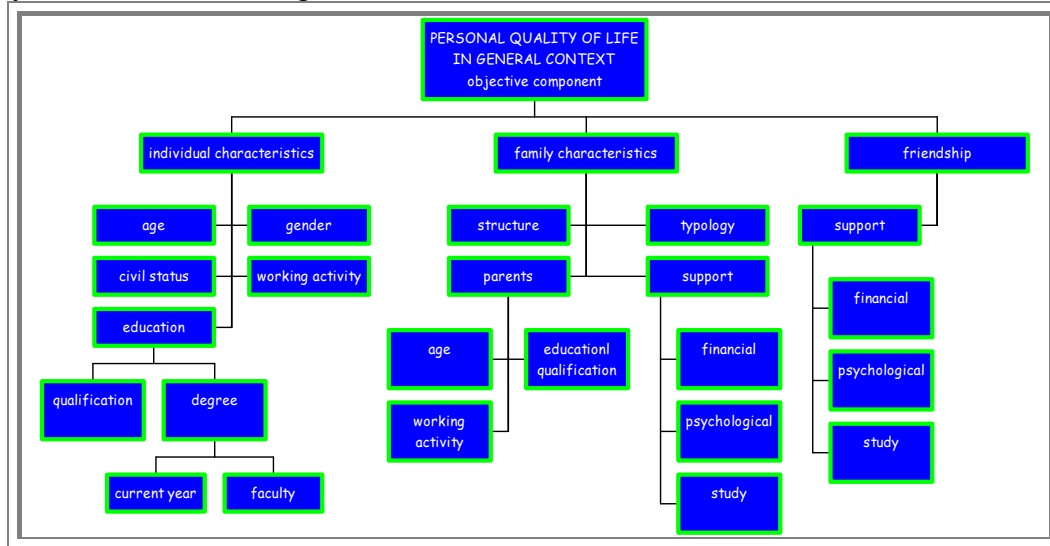
Four investigation areas were identified for each of which they were defined sub-areas, summarized in the following scheme.





### 2.1.2 General quality of life: objective component

Such an ambit is defined by individual aspects and conditions that can directly or indirectly affect the quality of life. The following scheme summarizes the identified sub-areas and the variables:

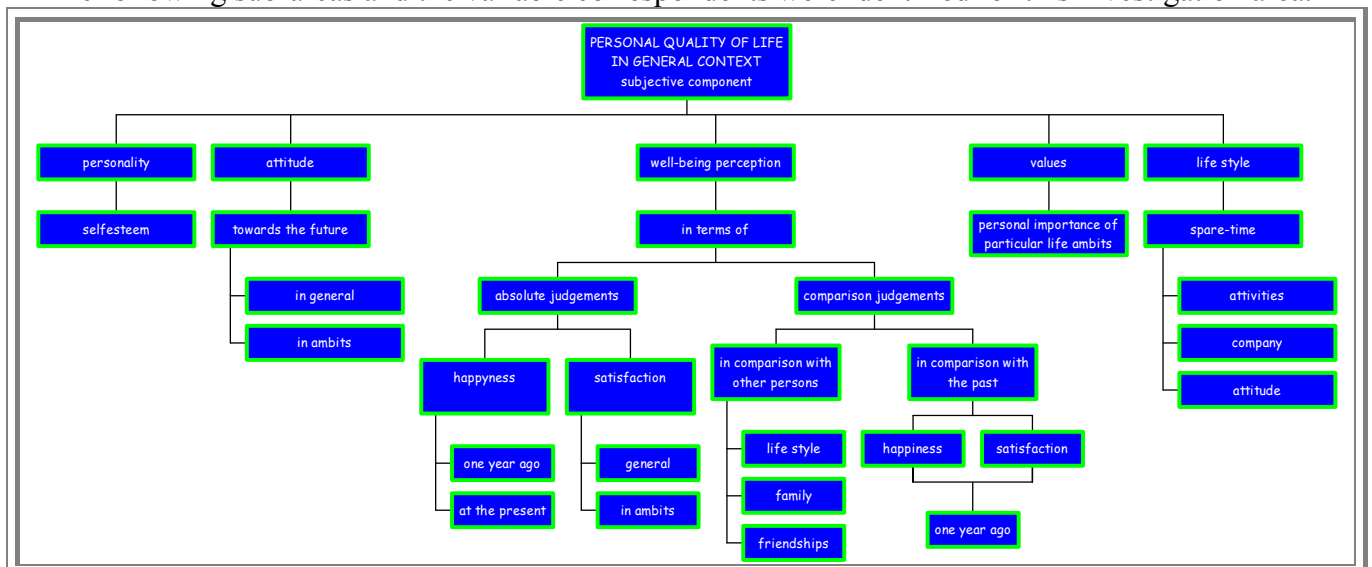


The investigation of such variables did not require particular technical approaches (see questionnaire in appendix A).

### 2.1.3 General quality of life: subjective component

The measurement of well-being and quality of individual life were defined according to the defined conceptual model. As we know, the subjective perception of well-being represents a composite concept that can be measured by the formulation of a total measure or by the identification of a set of satisfaction measures in different ambits. The aim of the study was to test the measurement of subjective well-being by absolute and comparison scales and measures.

The following sub-areas and the variable correspondents were identified for this investigation area.



### 2.1.3.1 *Self-esteem*

It is measured by the well known multi-item scale by Rosenberg (1965), which considers the self-esteem dimension as a component of the personality which involves confidence in him/herself and in his/her capacities.

Each individual had to point out his/her level of agreement for each of the definite assertion.

### 2.1.3.2 *Attitude towards the future*

A particular aspect which (directly and indirectly) allows to evaluate the quality of individual life is certainly the perception of the dimension of the future both in general terms and with respect to particular ambits. This item was defined by a graphical scale in order to avoid the problems related to possible misinterpretation of verbal labels; the intermediate or neutral position was interpreted as the "impossibility of knowing what will happen". This graphic approach represents a particular reformulation of the Circle Scale: in each segment, associated to a specific ambit, the respondent had to insert the symbols "+" and "-", depending on the personal evaluation; this approach forced the subject to decide between a positive or negative vision of the future.

### 2.1.3.3 *Perception of subjective well-being*

In order to measure subjective well-being perception we applied two different scaling approaches: absolute (the respondent was asked to report his/her evaluation by a direct judgment) and comparison (the respondent was asked to report his/her evaluation by a comparison judgment).

#### **"Absolute" approach**

Subjective well-being were defined in terms of two components:

- affective component, in its "happiness" connotation,
- cognitive component, in its "general satisfaction" connotation.

Single-item measures were used for the measurement of such components, respectively:

- *Faces Scale* (Andrews-Whitey), the well-known graphical scale defined by seven faces representing different states.
- *Rating scale*, defined by eleven points: the respondent had to point out the score, between 0 (maximum dissatisfaction) to 10 (maximum satisfaction), which better represented his/her satisfaction condition.

The literature has shown the appropriateness of these single-item scales, in terms of validity, in many application. In particular the *Faces scale* showed acceptable levels of convergent validity towards other happiness measures, like the Happiness Measures, composed from two item which measure the wealth move (Fordyce, 1988). The high number of steps of the *rating scale* proved a greater level validity (Schifini, 2003).

The measurement of the subjective well-being in different ambits considers several aspects: friendship, family, health, spare time, financial situation (personal and family). Also the level of satisfaction for each of such ambits is measured through an 11 point rating scale. The numerous items were aggregated synthetic indicators of total evaluation of the general subjective well-being. For this measurement a classical "satisfaction rating stair" was used to eleven steps ( from 0, for nothing, to 10, completely ).

The use of rating scales allowed to avoid the problems related to possible misinterpretation of verbal labels and contributed to the construction of synthetic indicators of individual well-being by statistical approach.

### **“Comparison” approach**

The comparison approach is founded on a particular consideration: any individual evaluation cannot actually be absolute but is produced by comparisons that the respondent does (consciously or unconsciously) with respect to him/herself, in terms of expectations, of past experiences, of other people, of his/her general perception.

Three comparison criteria were chosen in this application:

- with familiar persons (with respect to life style, family-situation and friendships),
- with the past (with respect to happiness and satisfaction),
- with other people (with respect to general level of life).

#### Comparison with respect to familiar persons

The first approach was adopted to measure the perception the subject has of his/her life with respect to the others; we redefined the classical scale of "social comparison" [reference...]. The respondent was asked to compare several situations of his/her life with those of three persons, identified and well-known by the respondent. It is not important for the researcher to identify exactly the three persons; the referred judgments allow to infer what perception the respondent has of his/her life.

#### Comparison with respect to the past

The approach was adopted for happiness and satisfaction dimensions with respect to the previous year.

#### Comparison with respect to other people

This kind of comparison allows to measure the perception of the respondent towards life through the comparison with other people: differently from the previous comparison approach (with respect to three well-known people), this comparison takes place in general line with a wider group of people (Andrews, 1976). The difficulty of this approach is the different interpretation that the respondents may have about the term of comparison that can be positive (“I have the same satisfactory life as many/few other people”) or negative (“I have the same unsatisfactory life as many/few other people”).

### **2.1.3.4 Values**

In order to evaluate the importance attributed to each ambit (family, career, friendships, partner, etc.), rank-order scale was applied. The respondent was asked to assign a list number to all the ambits, presented simultaneously, according to the importance criterion (1 for the most important, 2 for the second most important, up to 10 the least important).

### **2.1.3.5 Life style: the spare time**

The life-style ambit was investigated in terms of spare time with respect to three aspects:

- type of activity that the respondent usually carries on,
- people with whom the activity is practised,
- attitude towards the spare time in general.

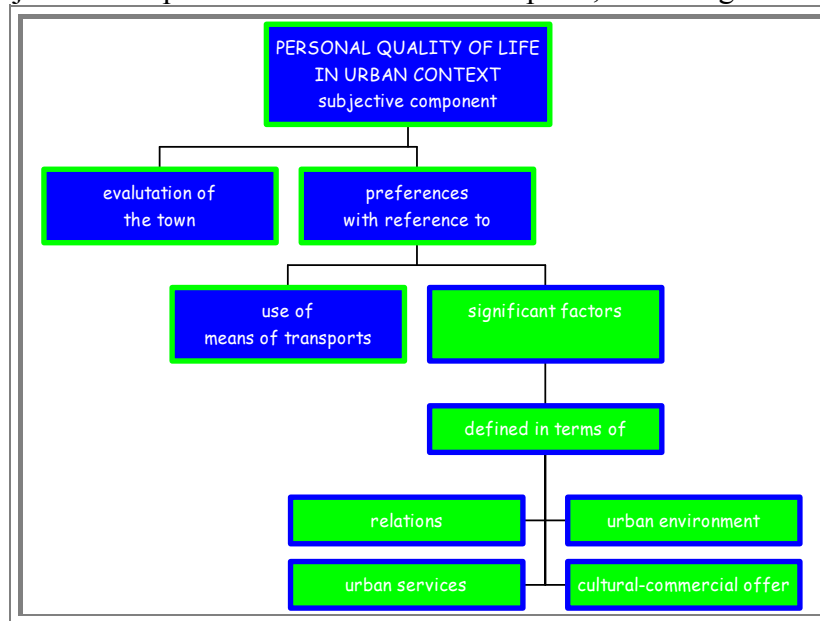
Two items were defined to investigate the type of activities (multiple response items).

In order to measure the individual attitude towards spare time, a set of statements was defined with respect to each of which every respondent had to refer his/her agreement/disagreement.

## 2.1.4 *Quality of the individual life in the urban environment*

### 2.1.4.1 *Subjective component*

Considering that the objective component concerned the residence (residence town) and the habitation, the subjective component concerned various aspects, according to this scheme:



#### **Image and evaluation of one's town**

Differential semantic approach was adopted to measure the evaluation of one's town: each respondent was asked to point out the position between two defined adjectives that better represents his/her idea. Seven positions were identified between the two adjectives and 21 were the couple of adjective identified.

#### **Means of transport: preferences**

Moving through the center of a town represents one of the problems of Italian urban life. The perception of this aspect was investigated by the paired-comparison scaling technique: each respondent was asked to choice between two presented means of transport; all combinations were defined. Such technique does not obviously allow to investigate the motivations of such choices; the analysis produces a metrical stair on which all the stimuli find a position (Thurstone method).

#### **Preference with respect to particular relevant factors**

In order to measure and analyze the preferences with respect to particular relevant factors of the urban life the conjoint model was adopted; for such a reason a chapter is dedicated such an ambit to part.

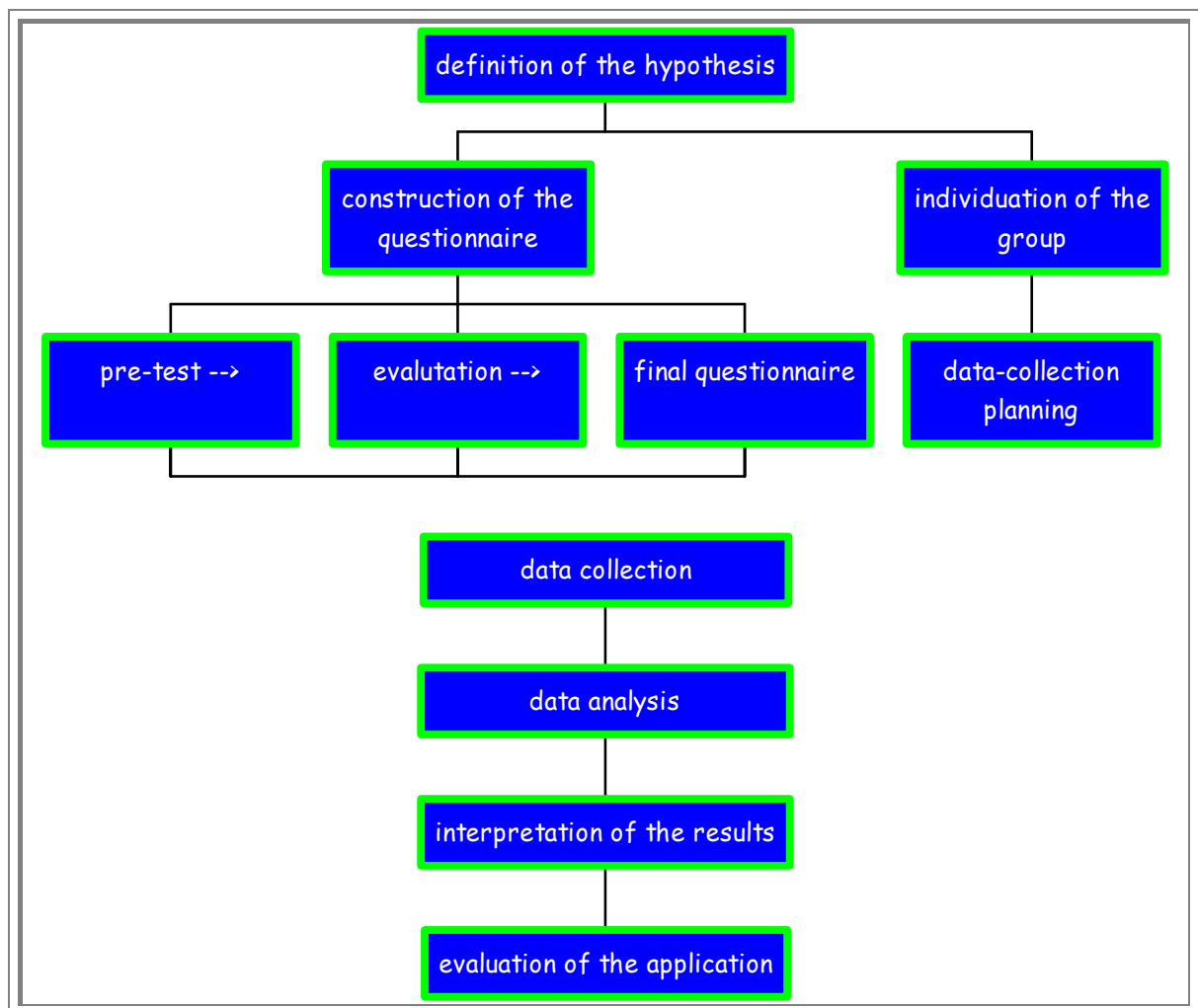
## 2.1.5 *The sample*

Since the goal of the study was essentially methodological (assessing a particular measurement approach), we preferred to define a homogenous experimental group, in terms of individual and

social characteristics (age, marital status, education level and so on); this choice allowed to attribute the possible variability in the results more to methodological problems than individual. A group of university students was identified (49), attending a course of applied statistics at the University of Florence (Italy); in C appendix is possible to evaluate the characteristics of the group which agreed to homogeneity need of the study. The questionnaire was submitted at the beginning of the course to all the subjects in the same moment and the same place.

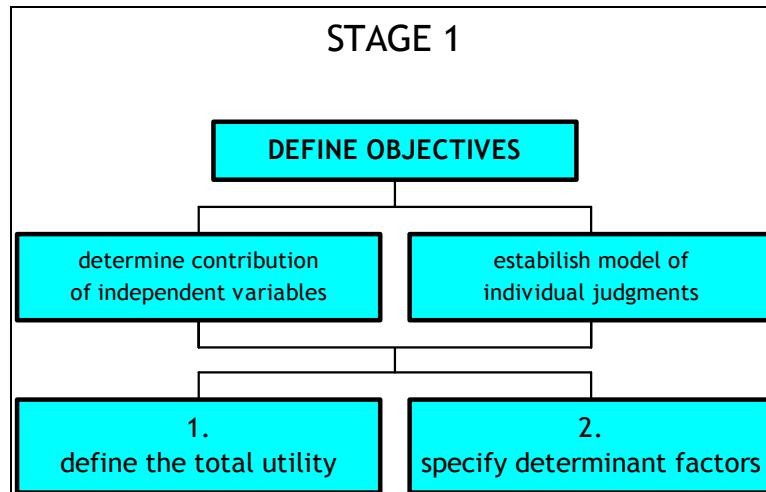
### 2.1.6 Stages of the study

From the organizational point of view, the study followed the following phases:



## 2.2 Stages of conjoint-analysis application

### 2.2.1 The objectives

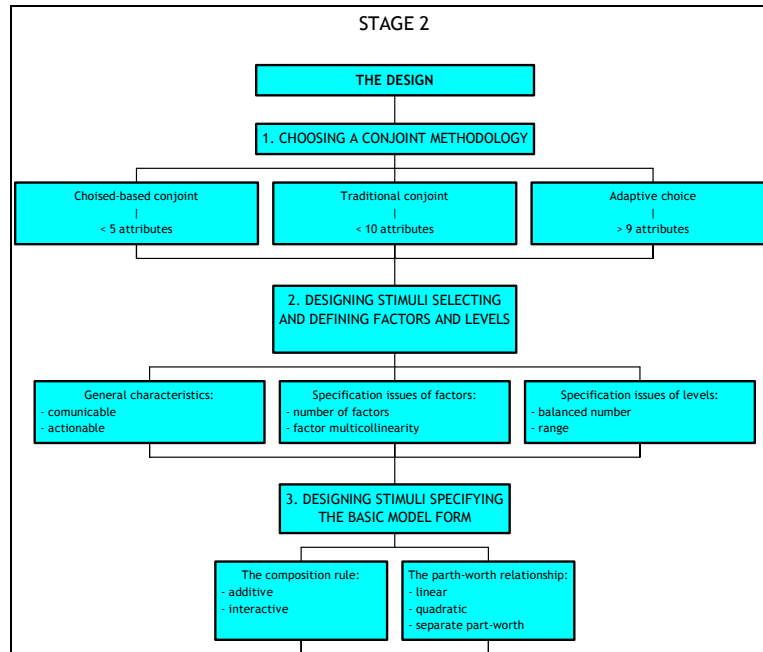


Taking into account the complexity of the urban life, we proceeded in the identification of the following ambits (with a particular thought at the town in Florence):

- *human relations*, defined by all the interpersonal relationships an individual can have in the everyday life with the family, the friends, the neighbours, the colleagues;
- *urban environment*, defined by environmental elements such as air, water, decoration of city structure;
- *urban services*, defined by the services which a town offers in terms of transports, parking areas, cycle tracks, access to the center;
- *cultural-commercial offer*, definite in term of high-education proposals, of presence of artistic and tourist structures, of quality and advantage of commercial products.

The chosen ambits and their definitions do not have the pretension to be exhaustively descriptive of the urban reality; the experimentation is placed essentially in the context of a verification of the applicability of the conjoined approach to the particular ambit of the social investigation represented by the study of quality of life.

### 2.2.2 The design



#### 2.2.2.1 Selecting a Conjoint Analysis Methodology

We decided to adopt a particular approach to the aggregate analysis. The aim of the adopted methodology is

- estimating the part-worth and the values of per cent relative importance and evaluate the adaptation of the after model having identified homogeneous groups with respect to the preferences expressed,
- analysing, for each group the part-worth values and compare the groups identified in terms of relative importance of each factor (comparison of the group profiles).

In this case the data analysis procedure follows the following passages for each of the defined ambits (the numbers presented will be use also in the next presentation of the results):

- (1) Identification, for each defined ambit, of homogeneous groups among respondents with regards to the preferences expressed in terms of “order”. The proximity analysis (by a geometrical-statistical approach) of the individual profiles, each of which is formed by rank order values, identifies homogeneous groups of respondent. The definition and the composition of the groups turned out to be different among the ambits. The median of the rank values expressed by respondents of the same identified group was consequently attributed to each group in order to applied conjoin analysis for each individual group.
- (2) Identification of the most important factors and levels for each individual group; analysis, for each identified group, of the values of part-worth registered for each factor. A disaggregation approach was applied in order to estimate the model and evaluate its goodness-of-fit, considering each group as a single individual (*individual assessment*).
- (3) Comparison between the groups as regards to the relative importance of the factors.
- (4) Interpretation of the differences between the groups by means of external variables.

### **2.2.2.2     *Designing Stimuli: Selecting and Defining Factors and Levels***

For each of the considered ambit, we proceeded to the identification of the factors turned out to be important. Each of the stimuli, which define each ambit, was built through the combination of all the identified factors, according to the different levels. Generally, each factor was defined by at least three levels (for instance, one positive, one intermediate and one negative). The tables, presented below, allow to identify both the factors and the corresponding levels for each ambit.

#### **Relations**

Four factors were identified for the definition of the stimuli: (a) family relations, (b) neighbourhood relations, (c) interpersonal relations, included friends, and (d) relations with the work colleagues. Such procedure found a few difficulties in the definition of the third factor.

#### **Urban environment**

Four factors were identified for the definition of the stimuli: (a) urban green (parks, gardens, open spaces), (b) quality of the water, (c) road maintenance and (d) urban lighting.

#### **Urban services**

Four factors were identified for the definition of the stimuli: (a) public transports, (b) access to the town center, (c) cycle tracks and (d) surveillance.

The identified factors certainly turned out to be restrictive since other factors describing urban services certainly exist. However the definition of a high number of factors would have compromised the intelligibility of the stimuli to be submitted to the respondents. Here we prefer to give importance to the urban mobility, one of the problematical dimension of the city of Florence. As noticeable, the identified levels were not ordinal for all the factors, as in case of the levels concerning the factor "access to the town center".

#### **Cultural-commercial offer**

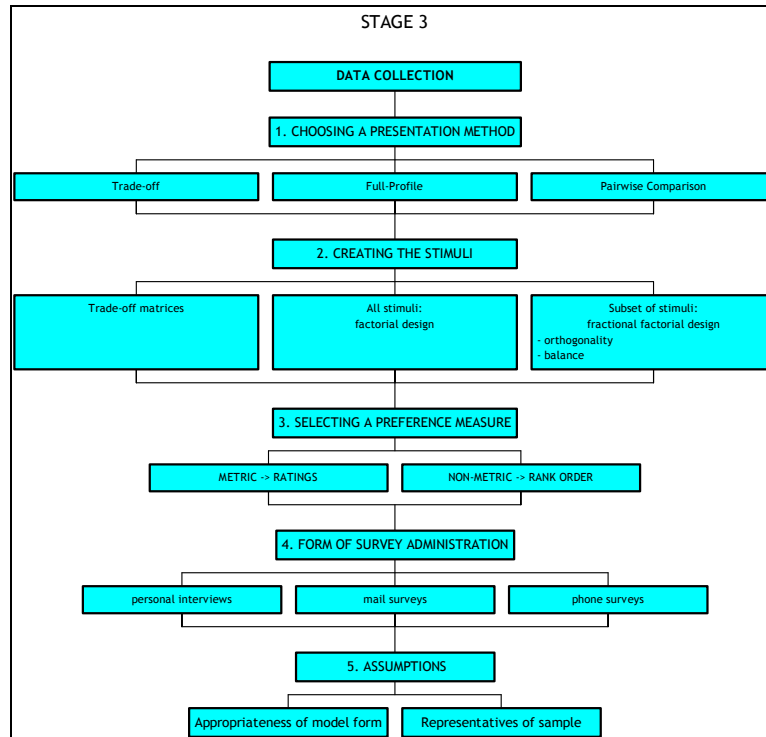
Four ambits (factors) of offer were identified in this particular application: (a) tourist presence, (b) presence of artistic structures, (c) high-education proposals and (d) quality and advantage of commercial products (defined by only two levels). Such factors point out aspects of a particular town typology to which Florence belongs.

### **2.2.2.3     *Specifying the Basic Form of the Model***

The relation between the defined factors was assumed to be monotonous since we were not able to assume more restrictive relations such as the linear one.



### 2.2.3 Data Collection



#### 2.2.3.1 Choosing a Presentation Model

Particular attention was dedicated to the form of representation of the stimuli. We decided to adopt a criterion of different representation for each of the groups of stimuli to be built.

##### Ambit: "relations"

- *essential graphics*: minimum presence of particulars,
- *presence of dialogues between the represented characters*,
- *absence of guide-character*: less possibility for the respondent of identification,

##### Ambit: "urban environment"

- *complex graphics with detailed set*,
- *absence of dialogues*,
- *presence of a guide-character*,
- *each factor represented in a very similar way through the various set (however possible)*.

##### Ambits: "urban services" and "cultural-commercial offer"

- *absence of graphics*,
- *synthetic and schematic verbal description of each stimulus; this allowed to avoid elaborated and complex description which requires a greater attention by the respondent*.

A professional designer was involved in the representation of the stimuli; he was preventively introduced to the logic of the conjoined model. The first drafts proposed by the designer were therefore submitted to the research group that evaluated the necessity of introducing any modifications. The designer tried to produce representations that were not too much characterized

and that did not present unintelligible elements. One the difficulties in representing the stimuli was the possibility to find concrete every-day-life situations that allowed the representation of both factors and levels, previously defined in abstract way.

In complete graphic representation, the designer tried to represent the same factor by different situation throughout the stimuli, in order to avoid any possible identification of the respondent (“relations” ambit); in other cases some elements were kept constant (“urban environment” ambit).

### 2.2.3.2 Creating the Stimuli

The creation of the stimuli consists in the definition of different combinations of the levels of the identified factors. In order to allow a realistic statistical estimate of the part-worths, the combinations of all positives or all negatives levels were obviously avoided. The adopted criterion, consciously subject to any critical evaluations, for levels combination was: combining a level considered negative, one considered positive and two intermediate; obviously satisfying such a criterion was not always possible.

The results of levels combination are presented in table xx; the representations used in the survey are included in appendix B.

Ambit: RELATIONS		Factors			
		<i>Family relations</i>	<i>Neighborhood relations</i>	<i>Interpersonal relations</i>	<i>Colleagues relations</i>
Stimuli	A	Supporting	Formal	Indifferent	Collaborative
	B	Intolerant	Formal	Superficial	Friendly
	C	Utilitarian	Intolerant	Friendly	Collaborative
	D	Utilitarian	Helping	Superficial	Competitive
Ambit: URBAN ENVIRONMENT		Factors			
		<i>Urban green</i>	<i>Water</i>	<i>Roads</i>	<i>Lighting</i>
Stimuli	A	Houses in the greenery	Drinking	In disorder	Feeble
	B	Well-kept public gardens	Not for drinking	Neglected	Excellent
	C	Deteriorated public gardens	Sound and delicious	Neglected	Feeble
	D	Well-kept public gardens	Drinking	Well-kept	Absent
Ambit: URBAN SERVICES		Factors			
		<i>Public transports</i>	<i>Access to the town center</i>	<i>Cycle tracks</i>	<i>Surveillance</i>
Stimuli	A	Excellent	By shuttle	Badly organized	Zonal
	B	Frequent	By shuttle	Absent	Vast
	C	Punctual	By ticket	Badly organized	Sporadic
	D	Punctual	Parking areas around the center	Well organized	Sporadic
Ambit: CULTURAL-COMMERCIAL OFFER		Factors			
		<i>Tourist presence</i>	<i>Presence of artistic structures</i>	<i>High-education proposals</i>	<i>Quality/advantage of Commercial products</i>
Stimuli	A	Seasonal	Absent	Wide	Reasonable
	B	Continuous	Limited	Absent	High quality
	C	Seasonal	Intense	Poor	High quality
	D	Absent	Limited	Poor	Reasonable

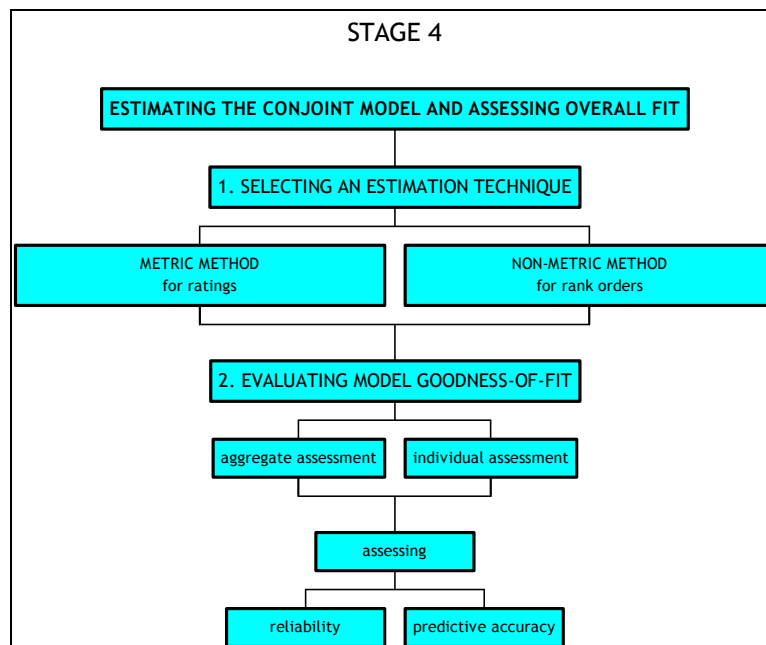
### 2.2.3.3 *Selecting a Measure of Preference*

We decided to select a non-metrical preference measure: for each ambit, each respondent ordered the submitted stimuli in preference order with negative polarity (value 1 attributed to the favourite situation).

### 2.2.3.4 *Survey Administration*

The survey was carried out during the first lessons of the course of Statistics at the Faculty of Psychology of the University of Florence (2003); each student individually answered the whole questionnaire after a short presentation. That requires one hour.

### 2.2.4 *Estimating the Conjoint Model and Assessing the Overall Fit*



The chosen estimate technique is the one suitable for the adopted measure of preference (non-metrical).

The results have shown an excellent general adaptation of the model to the data.

## 2.3 THE DATA ANALYSIS AND THE EVALUATION OF THE RESULTS

The results will be presented for the passages previously identified:

- (1) Identification, for each defined ambit, of homogeneous groups among respondents with regards to the preferences expressed in terms of “order” (hierarchical cluster analysis applied on the individual profiles formed by rank order values<sup>1</sup>).
- (2) Estimates of the parameters: identification of the most important factors and levels for each group (the outcomes of this passage are shown in the appendix C).
- (3) Comparison between the groups as regards to the relative importance of the factors.
- (4) Interpretation of the differences between the groups through external variables (analyses of the correspondences).

### 2.3.1 Ambit: the relations

(1)

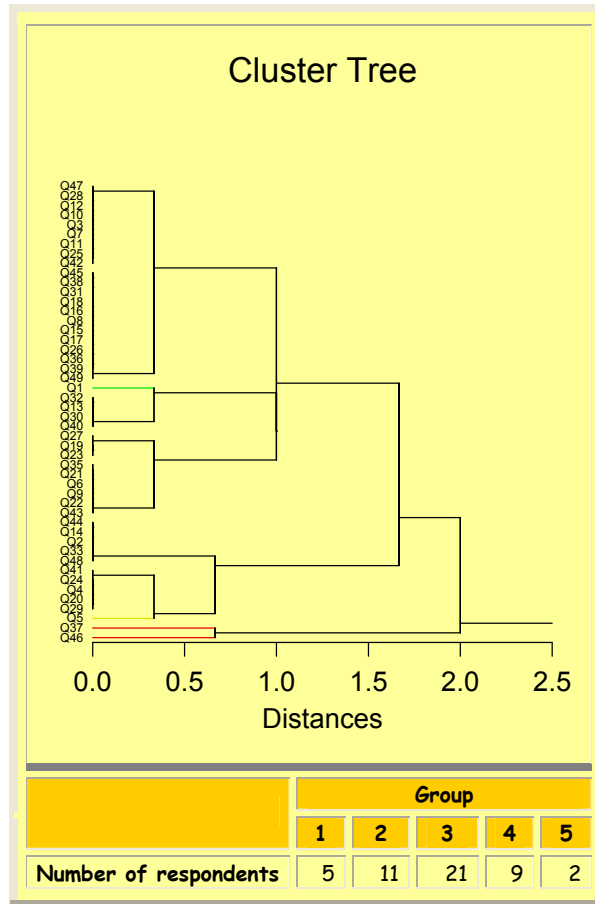
Observing the frequency distribution of each stimulus, we can observe a certain polarity in the choice of the first position attributed principally to the stimulus *a*. The frequency distribution of the registered by the other stimuli tends to be rectangular (table 2.xx).

Ambit:		Rank order			
RELATIONS		1°	2°	3°	4°
stimuli	A	40	6	1	1
	B	1	14	19	14
	C	6	16	15	11
	D	1	12	13	22

The application of the hierarchical cluster analysis to the individual profiles highlighted the presence of five groups, by choosing as maximum distance between cluster the measure of 0.7 inside the dendrogram.

<sup>1</sup> Distances between individual profiles were calculated through *gamma* coefficient by Goodman-Kruskal; distances between groups were calculated through complete linkage technique.

## 2. The Application

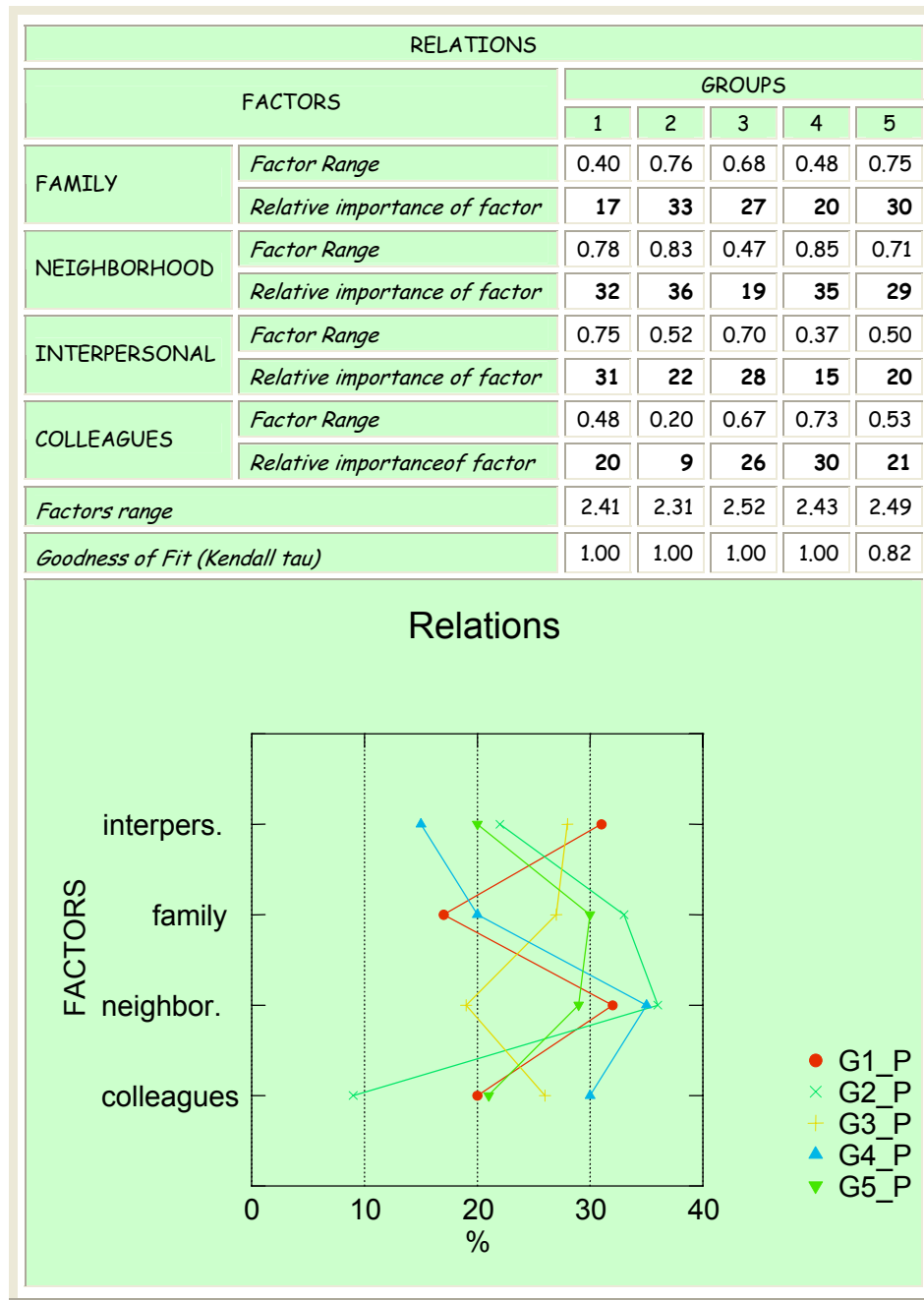


The profile of each group was therefore obtained by calculating the median of the rank values expressed by respondents of the same identified group.

Ambit: RELATIONS		Factors				Rank order values for each group				
		<i>Family relations</i>	<i>Neighborhood relations</i>	<i>Interpersonal relations</i>	<i>Colleagues relations</i>	1	2	3	4	5
Stimuli	A	Supporting	Formal	Indifferent	Collaborative	2	1	1	1	3.5
	B	Intolerant	Formal	Superficial	Friendly	4	2	3	4	3.5
	C	Utilitarian	Intolerant	Friendly	Collaborative	1	4	2	3	1.5
	D	Utilitarian	Helping	Superficial	Competitive	3	3	4	2	1.5

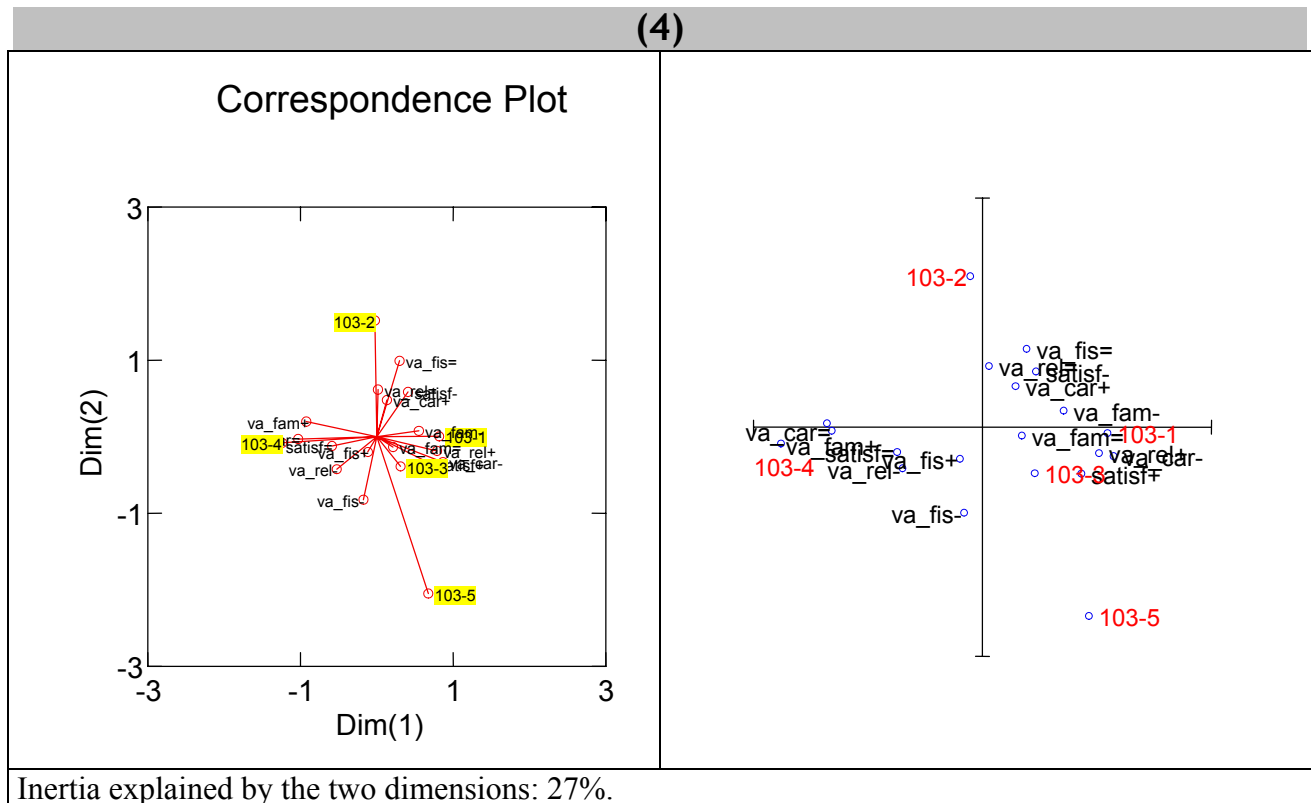
(2)

(3)



The examination of the differences between the values of the relative importance of factors allows the description of the identified groups in terms of preferences/priorities with regard to the relations:

Group	Preference for relations
1	Friendly
2	Indifferent
3	Family
4	Utilitarian
5	Superficial-friendly



The examination of the outcomes of correspondence analysis allows the description of each group with regard to some external variables.

Groups 1 (preferences): (friendly relations)

- Importance to the relations: high
- Importance to the family: mid-low
- Importance to the career: low
- Life satisfaction: mid-high
- Importance to the physique: not characterizing

Group 2 (preferences): (indifferent relations)

- Importance to the relations: middle
- Importance to the family: middle
- Importance to the career: high
- Life satisfaction: med-low
- Importance to the physique: middle

Group 3 (preferences): (family relations)

- Importance to the relations: mid-low
- Importance to the family: middle
- Importance to the career: low
- Life satisfaction: mid-low
- Importance to the physique: mid-low

Group 4 (preferences): (utilitarian relations)

- Importance to the relations: low
- Importance to the family: high
- Importance to the career: middle
- Life satisfaction: middle
- Importance to really physical: high

Group 5 (preferences): (superficial friend relations): few individuals to identify any characterization.

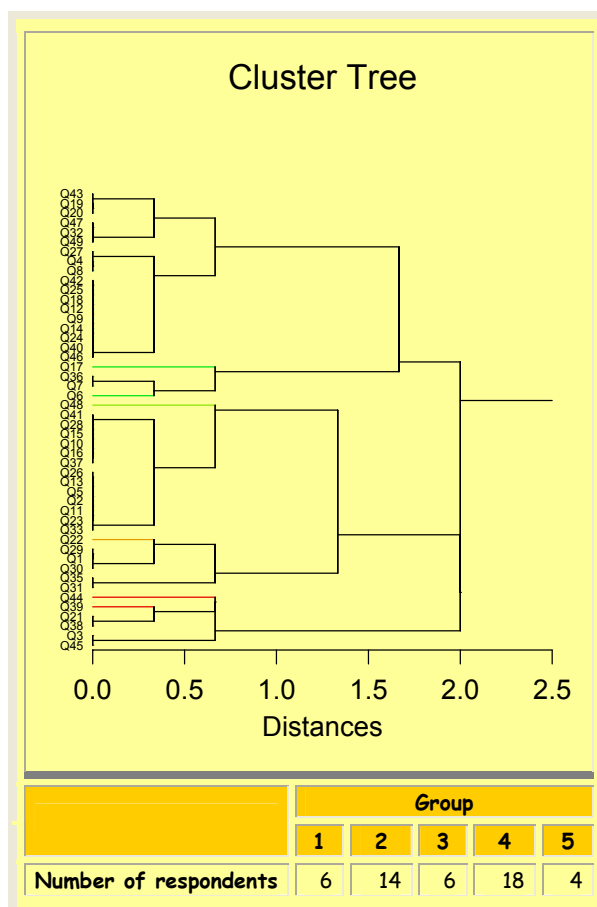
### 2.3.2 *Ambit: the urban environment*

(1)

Here again a certain polarity can be observed in the choice of the first position attributed principally to the stimulus *a*. The frequencies registered by the other backgrounds are quite comparable:

Ambit:		Rank order			
URBAN ENVIRAMENT		1°	2°	3°	4°
Stimuli	A	25	16	3	4
	B	9	16	16	7
	C	10	12	9	17
	D	4	4	20	20

The dendrogram yielded by the application of hierarchical cluster analysis to individual profiles clearly shows (choosing as maximum distance between cluster the measure of 0.7 quite) the presence of 5 groups:



The profile of each group was therefore obtained by calculating the median of the rank values expressed by respondents of the same identified group.

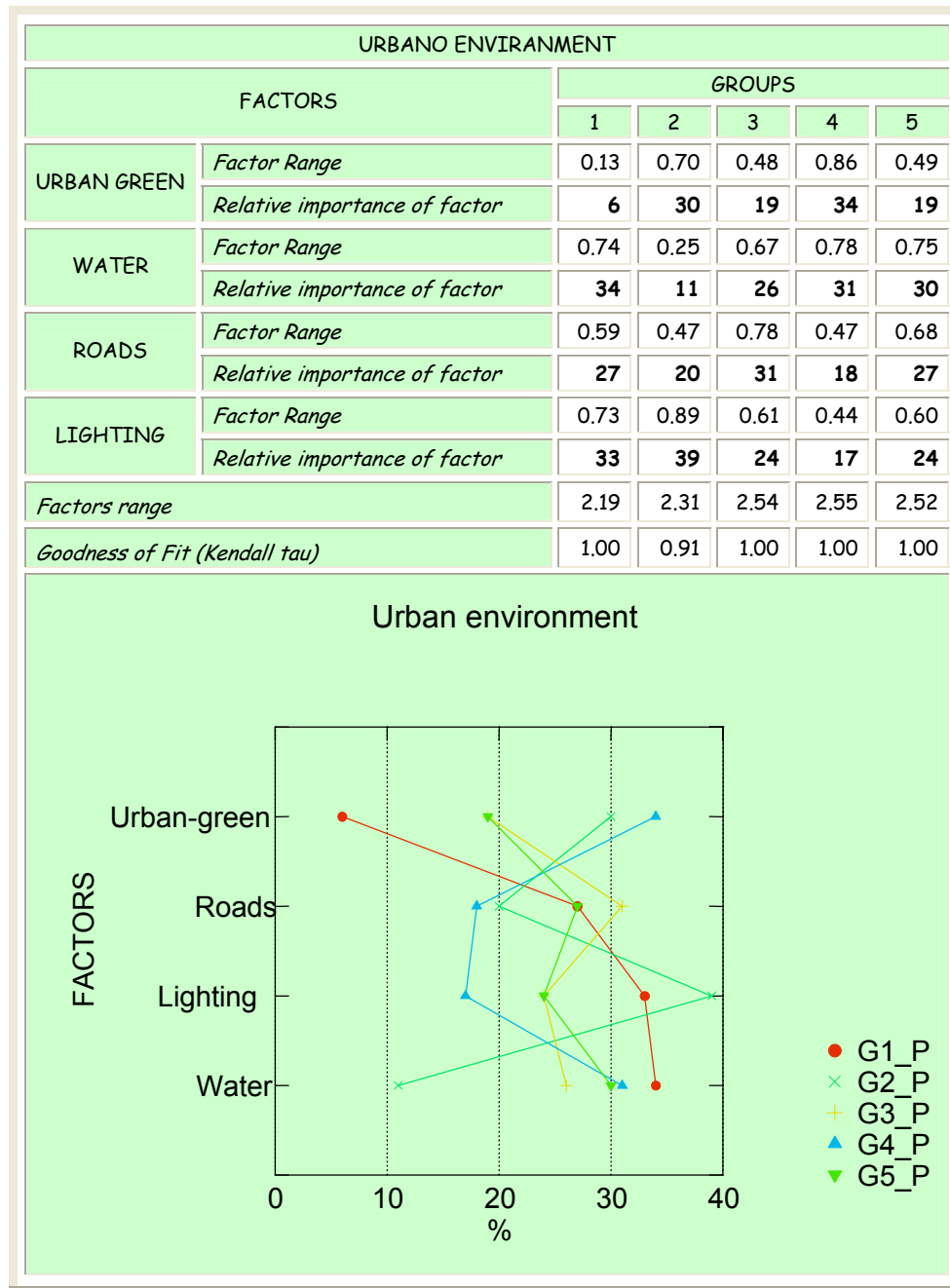


## 2. The Application

Ambit: URBAN ENVIRONMENT		Factors				Rank order values for each group				
		<i>Urban green</i>	<i>Water</i>	<i>Roads</i>	<i>Lighting</i>	1	2	3	4	5
Stimulii	A	Houses in the greenery	Drinking	In disorder	Feeble	1	1.5	2	1	4
	B	Well-kept public gardens	Not for drinking	Neglected	Excellent	4	3	3	2	1
	C	Deteriorated public gardens	Sound and delicious	Neglected	Feeble	2	1.5	4	4	2
	D	Well-kept public gardens	Drinking	Well-kept	Absent	3	4	1	3	3

(2)

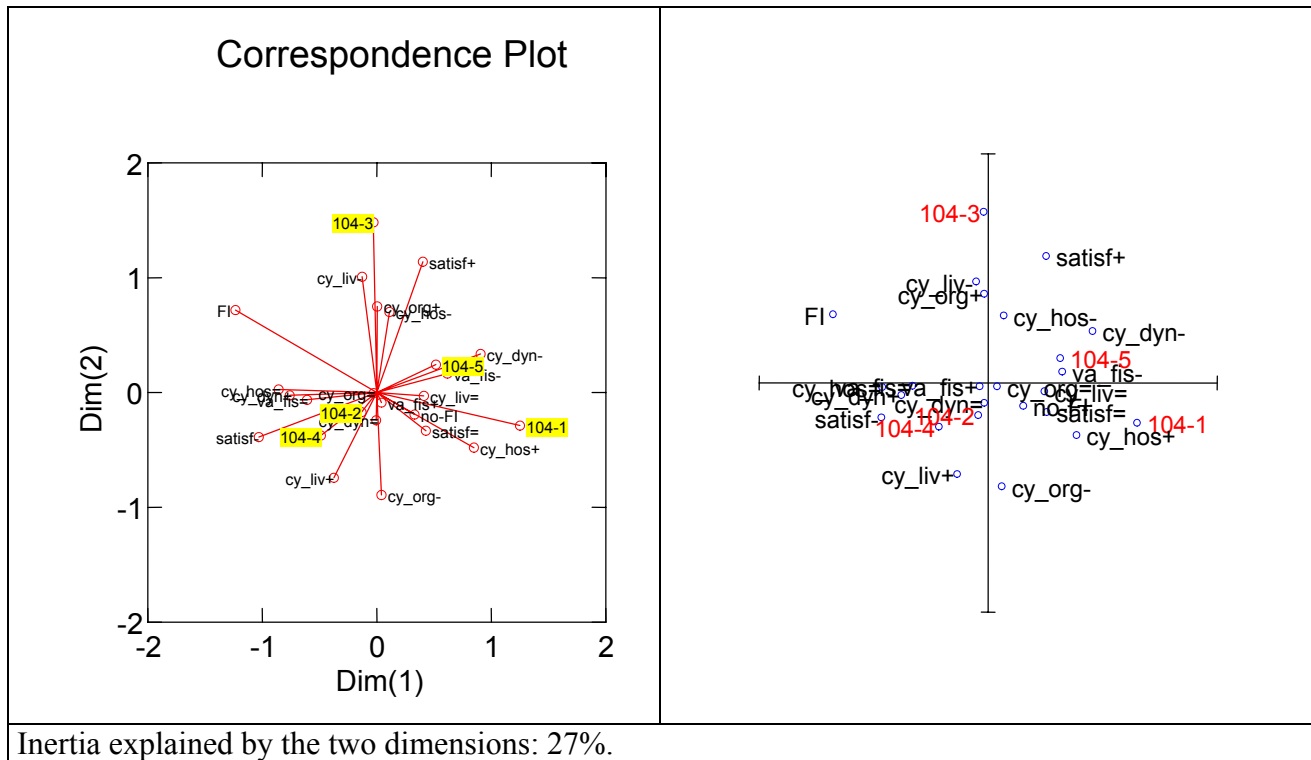
(3)



The examination of the differences between the values of the relative importance of factors allows the description of the identified groups in terms of preferences/priorities with regard to the urban environment:

Groups	Preferences for
1	Quality of the water
2	Quality of the lighting
3	Quality of the roads
4	Presence of green
5	Presence of roads that can travelled over

(4)



The examination of the outcomes of correspondence analysis allows the description of each group with regard to some external variables.

Group 1 (preferences): (quality of water)

- Image of dynamism: not characterizing
- Image of liveability: middle
- Image of organization: middle
- Image of hospitality: high
- Life satisfaction: middle

Group 2 (preferences): (quality of the lighting) e

group 4 (preferences): (presence of the green one)

- Image of dynamism: mid-high
- Image of liveability: not characterizing
- Image of organization: not characterizing
- Image of hospitality: middle
- Life satisfaction: mid-low

Group 3 (preferences): (quality of the roads)

- Image of dynamism: not characterizing
- Image of liveability: mid-low
- Image of organization: high
- Image of hospitality: not characterizing
- Life satisfaction: not characterizing

Group 5 (preferences): (presence of roads)

- Image of dynamism: low
- Image of liveability: mid-high
- Image of organization: mid-high
- Image of hospitality: not characterizing

- Life satisfaction: mid-high

The residence does not characterize any group.

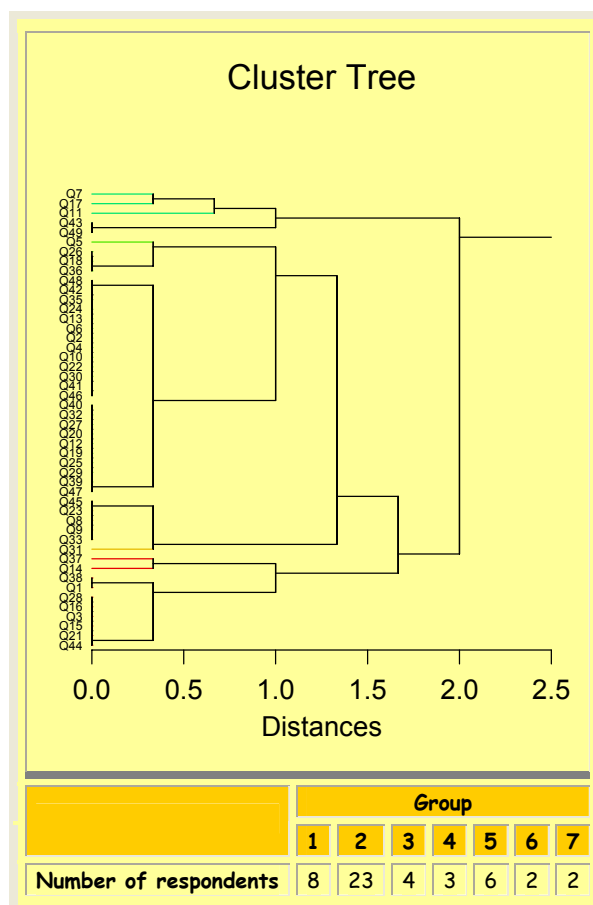
### 2.3.3 *Ambit: the urban services*

(1)

We can observe a certain polarity in the choices of the first position attributed principally to the stimulus *a*. The frequencies registered by the other backgrounds are quite comparable:

Ambit:		Rank order			
URBAN SERVICES		1°	2°	3°	4°
stimuli	A	33	9	2	4
	B	8	12	19	9
	C	1	5	10	32
	D	6	22	17	3

Placing the maximum distance to 0.8, the dendrogram yielded by the application of the hierarchical cluster analysis to individual profiles shows the presence of 7 groups, revealing a low homogeneity between the respondents:



The profile of each group was therefore obtained by calculating the median of the rank values expressed by respondents of the same identified group.

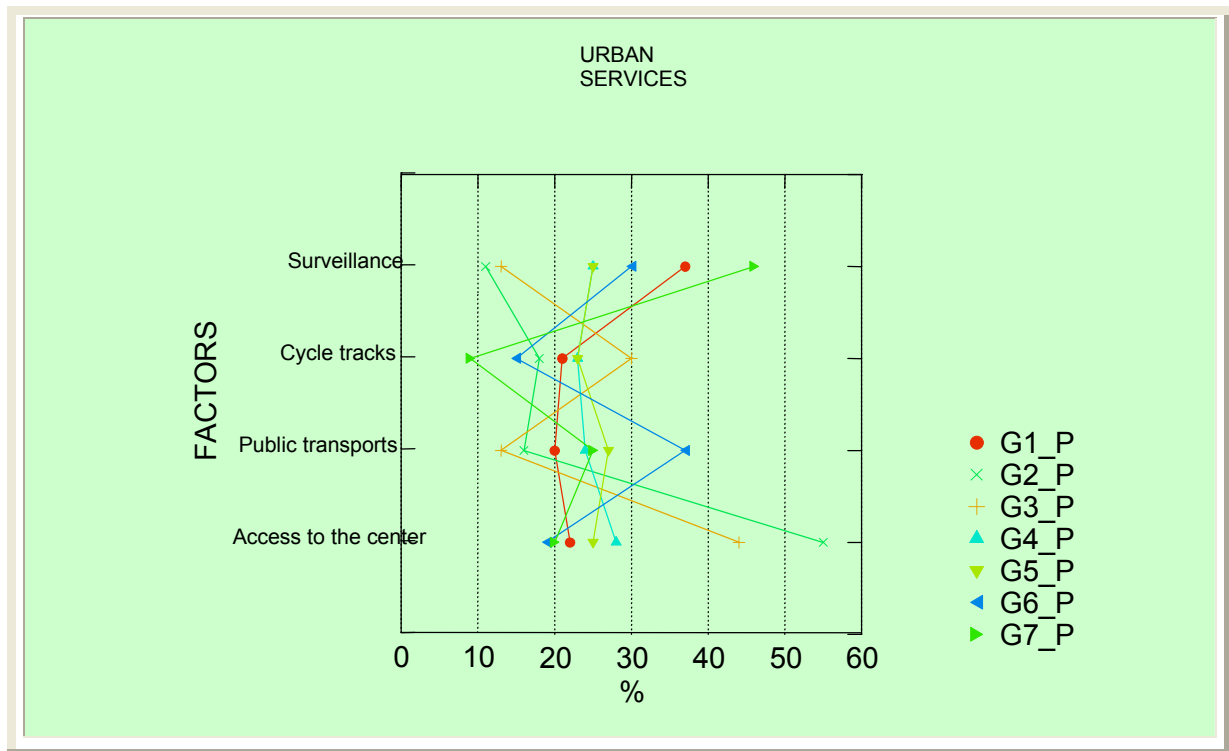
## 2. The Application

Ambit: URBAN SERVICES		Factors				Rank order values for each group						
		<i>Public transports</i>	<i>Access to the town center</i>	<i>Cycle tracks</i>	<i>Surveillance</i>	1	2	3	4	5	6	7
Stimuli	A	Excellent	By shuttle	Badly organized	Zonal	1	1	2	4	2	1	4
	B	Frequent	By shuttle	Absent	Vast	4	3	3	3	1	2.5	1
	C	Punctual	By ticket	Badly organized	Sporadic	3	4	4	2	4	2.5	3
	D	Punctual	Parking areas	Well organized	Sporadic	2	2	1	1	3	4	2

(2)

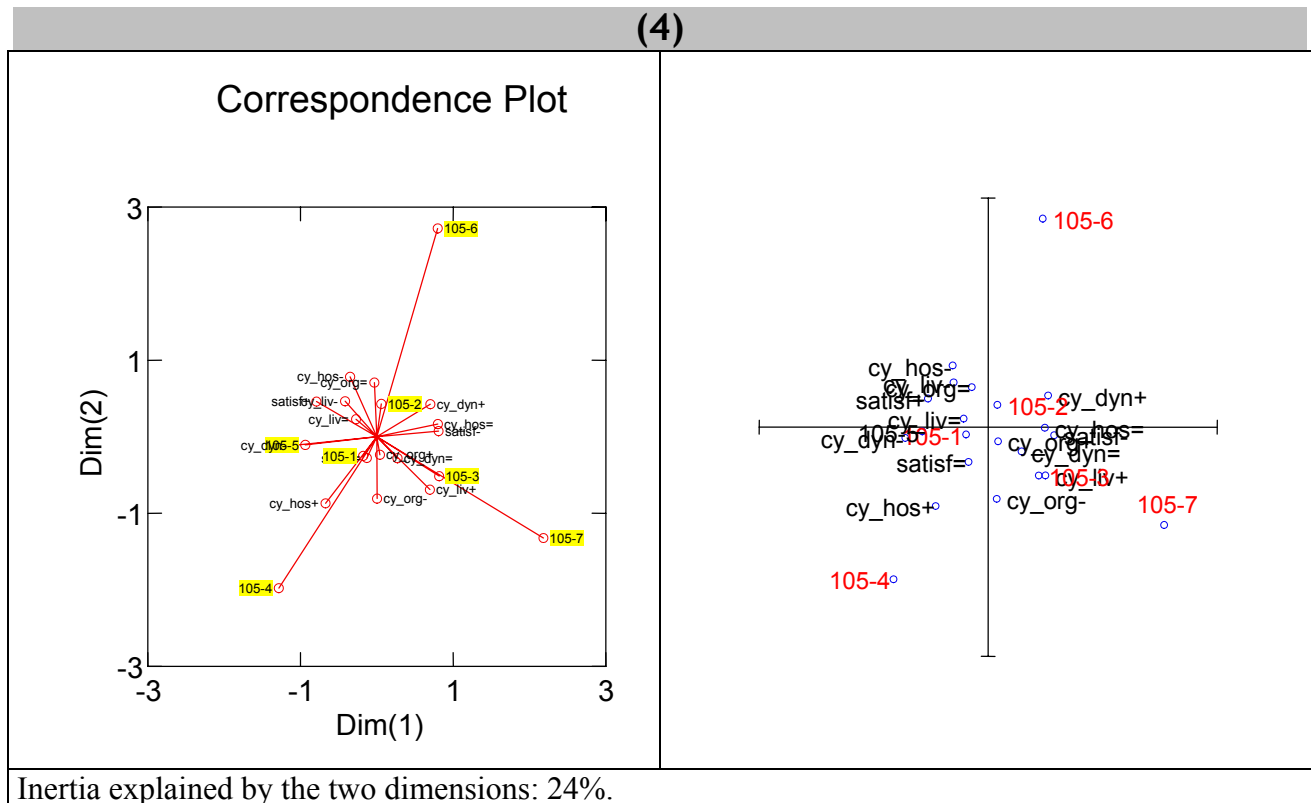
(3)

URBAN SERVICES								
FACTORS		GROUPS						
		1	2	3	4	5	6	7
PUBLIC TRANSPORTS	<i>Factor Range</i>	0.48	0.32	0.31	0.63	0.71	0.81	0.52
	<i>Relative importance of factor</i>	20	16	13	24	27	37	25
ACCESS TO THE TOWN CENTER	<i>Factor Range</i>	0.54	1.10	1.04	0.70	0.65	0.41	0.40
	<i>Relative importance of factor</i>	22	55	44	28	25	19	20
CYCLE TRACKS	<i>Factor Range</i>	0.51	0.37	0.73	0.60	0.61	0.34	0.19
	<i>Relative importance of factor</i>	21	18	30	23	23	15	9
SURVEILLANCE	<i>Factor Range</i>	0.90	0.23	0.31	0.65	0.67	0.66	0.94
	<i>Relative importance of factor</i>	37	11	13	25	25	30	46
<i>Factors range</i>		2.43	2.02	2.39	2.58	2.64	2.22	2.05
<i>Goodness of Fit (Kendall tau)</i>		1.00	1.00	1.00	1.00	1.00	1.00	1.00



The examination of the differences between the values of the relative importance of factors allows the description of the identified groups in terms of preferences/priorities with regard to the urban services:

Group	Preferences for
1	No surveillance
2	Free access to the center
3	Parking areas around the center
4	Parking areas and no surveillance
5	Public transports and surveillance
6	Efficient public transport
7	Frequent public transport



The examination of the outcomes of correspondence analysis allows the description of each group with regard to some external variables.

#### Group 1 (No surveillance)

- Image of dynamism: mid-low
- Image of liveability: middle
- Image of organization: high
- Image of hospitality: high
- Life satisfaction: middle

#### Group 2 (Free access to the center)

- Image of dynamism: high
- Image of liveability: not characterizing
- Image of organization: middle
- Image of hospitality: middle
- Life satisfaction: not characterizing

#### Group 3 (Parking areas around the center)

- Image of dynamism: middle
- Image of liveability: high
- Image of organization: mid-low
- Image of hospitality: middle
- Life satisfaction: low

#### Group 4 (Parking areas and no surveillance)

- Image of dynamism: not characterizing
- Image of liveability: not characterizing
- Image of organization: not characterizing
- Image of hospitality: high
- Life satisfaction: high

#### Group 5 (Public transports and surveillance)

- Image of dynamism: mid-low
  - Image of liveability:
  - Image of organization:
  - Image of hospitality: (high and low)
  - Life satisfaction: mid-high
- Group 6 (Efficient public transport)
- Image of dynamism: not characterizing
  - Image of liveability: not characterizing
  - Image of organization: not characterizing
  - Image of hospitality: not characterizing
  - Life satisfaction: not characterizing
- Group 7 (Frequent public transport)
- Image of dynamism: middle
  - Image of liveability: high
  - Image of organization: (high and low)
  - Image of hospitality: middle
  - Life satisfaction: mid-low.

#### 2.3.4 *Ambit: the cultural-commercial offer*

(1)

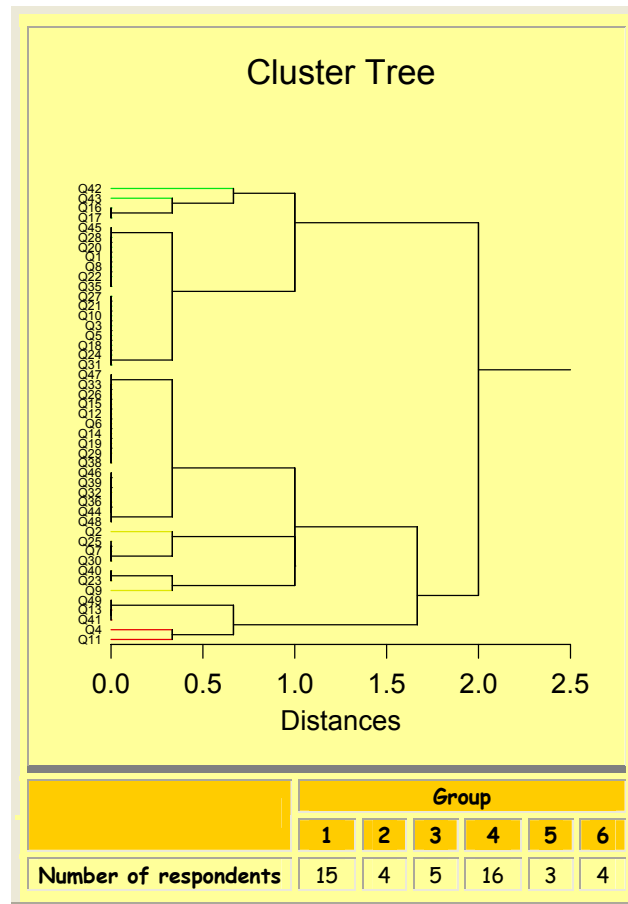
Once more the stimulus *a* turned out to be the most preferred, followed by the *c* one:

Ambit: OFFER		Rank order			
		1°	2°	3°	4°
Stimuli	A	25	11	8	3
	B	2	13	21	11
	C	19	16	8	4
	D	1	7	10	29

Placing the maximum distance to 0.8, the dendrogram yielded by the application of the hierarchical cluster analysis to individual profiles shows the presence of 6 groups, each of which presents the composition presented in the following table:



## 2. The Application

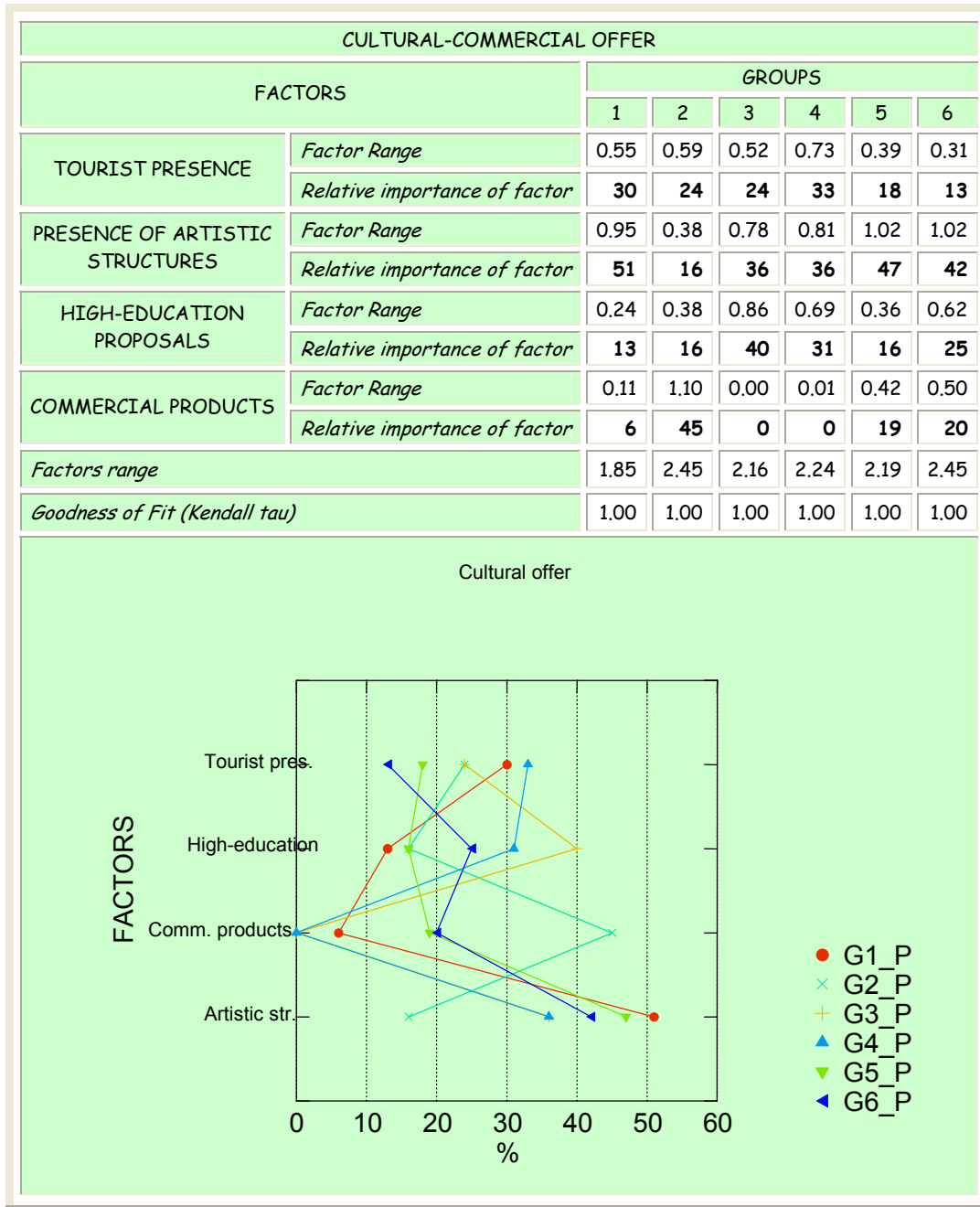


The profile of each group was therefore obtained by calculating the median of the rank values expressed by respondents of the same identified group.

Ambit: <i>CULTURAL OFFER</i>		Factors				Rank order values for each group					
		<i>Tourist presence</i>	<i>Presence of artistic dimension</i>	<i>High- education proposals</i>	<i>Quality/advantage of Commercial products</i>	1	2	3	4	5	6
Stimuli	A	Seasonal	Absent	Wide	Reasonable	2	1	1	1	1	4
	B	Continuous	Limited	Absent	High quality	3	4	2	3	3	2.5
	C	Seasonal	Intense	Poor	High quality	1	3	3	2	4	1
	D	Absent	Limited	Poor	Reasonable	4	2	4	4	2	2.5

(2)

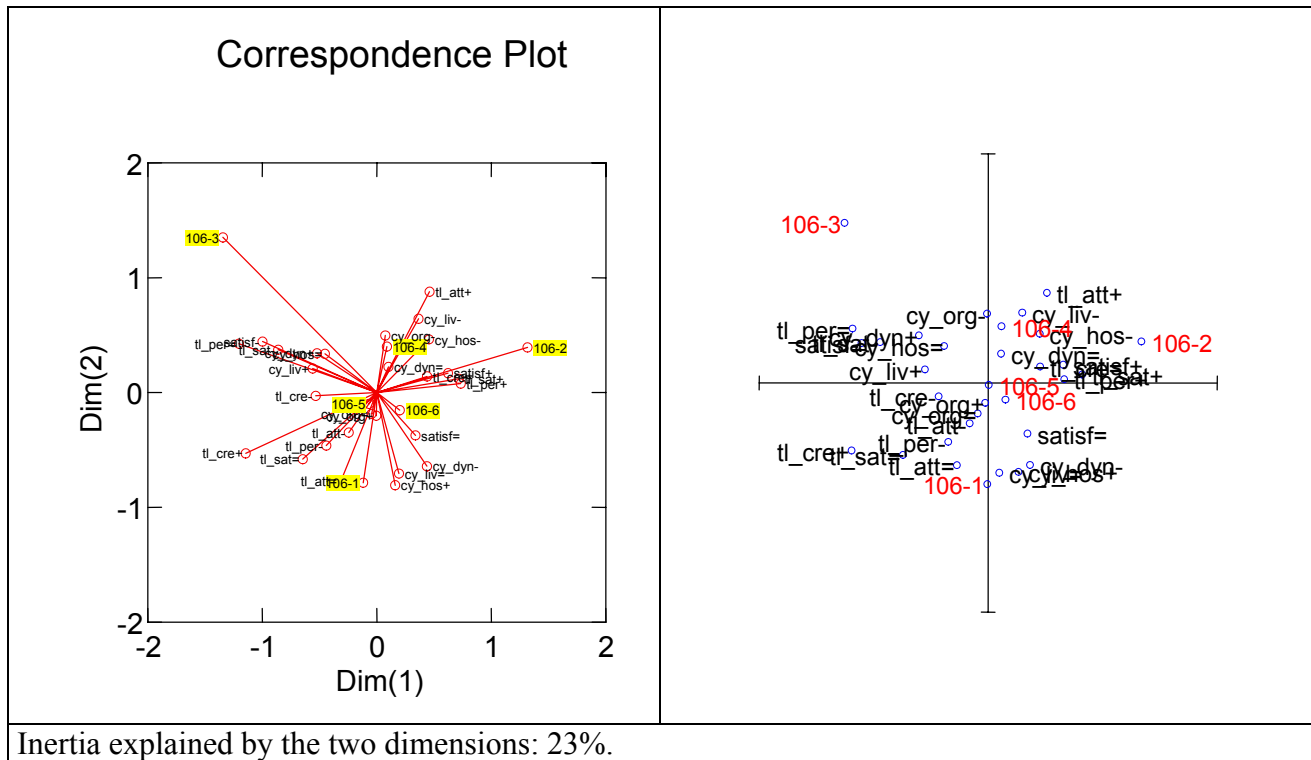
(3)



The examination of the differences between the values of the relative importance of factors allows the description of the identified groups in terms of preferences/priorities with regard to the offer:

Group	Preference for
1	Art in terms of/connected to tourism
2	Possibility to purchase with reasonable prices
3	Wide high-education proposals
4	No art
5	Artistic presence but not intense
6	Wide high-education and intense artistic dimension

(4)



The examination of the outcomes of correspondence analysis allows the description of each group with regard to some external variables.

#### Group 1 (Art in terms of/connected to tourism)

- Image of dynamism: mid-low
- Image of liveability: middle
- Image of organization: middle
- Image of hospitality: mid-high
- Spare-time in terms of satisfaction: mid-high
- Spare-time in terms of health: not characterizing
- Spare-time in terms of relations: mid-low
- Spare-time in terms of creativity: middle
- Life satisfaction: middle

#### Group 2 (Possibility to purchase with reasonable prices)

- Image of dynamism: not characterizing
- Image of liveability: low
- Image of organization: mid-low
- Image of hospitality: low
- Spare-time in terms of satisfaction: high
- Spare-time in terms of health: high
- Spare-time in terms of relations: not characterizing
- Spare-time in terms of creativity: middle
- Life satisfaction: middle and high

#### Group 3 (Wide high-education proposals)

- Image of dynamism: high
- Image of liveability: not characterizing
- Image of organization: low

- Image of hospitality: middle
- Spare-time in terms of satisfaction: middle
- Spare-time in terms of health: middle
- Spare-time in terms of relations: mid-high
- Spare-time in terms of creativity: not characterized/middle
- Life satisfaction: low

Group 4 (No art)

- Image of dynamism: middle
- Image of liveability:
- Image of organization: not characterizing
- Image of hospitality: mid-low
- Spare-time in terms of satisfaction: mid-high
- Spare-time in terms of health: high
- Spare-time in terms of relations: high
- Spare-time in terms of creativity: middle
- Life satisfaction: middle

Group 5 (Artistic presence but not intense)

- Image of dynamism:
- Image of liveability: not characterizing
- Image of organization: middle
- Image of hospitality: low
- Spare-time in terms of satisfaction: not characterizing
- Spare-time in terms of health: not characterizing
- Spare-time in terms of relations: not characterizing
- Spare-time in terms of creativity: middle
- Life satisfaction: high

Group 6 (Wide high-education and intense artistic dimension)

- Image of dynamism: mid-high
- Image of liveability: low
- Image of organization: high
- Image of hospitality: middle
- Spare-time in terms of satisfaction: high
- Spare-time in terms of health: high
- Spare-time in terms of relations: mid-low
- Spare-time in terms of creativity: middle
- Life satisfaction: middle

## **2.4 EVALUATING THE APPLICATION: GENERAL ISSUES**

The presented results surely encourage future applications of the conjoint approach in order to study citizens' preferences in the field of quality of life studies. In this perspective, some observations are opportune and advisable:

- (1) Great attention has to be paid to the definition of the levels of each identified factors: they are greatly influenced by the reality that the researcher has and that should be the same of the respondent;
- (2) The form of representation of the stimuli is not secondary: the choice between presence and absence of graphics is crucial but can find some intermediate solutions that, however, has to simplify the description of the factor-levels combination.
- (3) The interpretation of the results appears more significant when is supported by other personal information concerning individual characteristics collected by the contemporaneous submission of a questionnaire.
- (4) The possibility to analyze data by aggregating individual preference data allows to find many application of conjoint approach to different situation in the field of personal quality of life studies especially focused on the investigation of recurrent individual model of preferences that can connected to individual level of satisfactions.

## A. THE QUESTIONNAIRE

1. Birth year		19__ __		
2. Sex		male	female	
3. General Certificate of Education				
4. Degree				
5. Current Year		I	II	
		III	IV	
		V	out of prescribed time	
6. Family: number of components				
7. Civil status		single	married	
8. You live with:		parents	mother/father	
		brother/sister	grandparents	
		partner	children	
		other relatives		
		friends	other	
Parents	Educational qualification	9. mother	elementary certificate	second level certificate
			General Certificate of Education	first level degree, degree, doctorate
		10. father	elementary certificate	second level certificate
			General Certificate of Education	first level degree, degree, doctorate
	Age	11. mother		
		12. father		
	Professional position	13. mother	contractor	autonomous professional
			trader/artisan	worker
			employee	teacher
			pensioner	house working
			other	unemployed
		14. father	contractor	autonomous professional
			trader/artisan	worker
			employee	teacher
pensioner			house working	
other			unemployed	
15. You (or your family) are		the owner of the house	the tenant	
		other		
16. Do you live in Florence		yes	no	
17. If not, how many townspeople live in your city		less 2.000	from 2.000 to 10.000	
		from 10.000 to 20.000	from 20.001 to 40.000	
		from 40.000 to 100.000	over 100.000	
18. Do you do any paid work?		Yes, full time	Yes, part-time	
		No		

Appendix A. The Questionnaire

Using a score from 0 (at all) to 10 (completely satisfied), can you tell how much are you satisfied for:	0	1	2	3	4	5	6	7	8	9	10
1. your general life											
2. your friendship											
3. family relations											
4. the health of your family											
5. the financial situation of your family											
6. your financial situation											
7. spare-time											
8. your health											
9. your Faculty											
10. your university career											
11. relations with the other students											

Point out the face that better represents your happiness condition	
12. at the present	
13. one year ago	

How much do you agree with following sentences?	strongly agree	slightly agree	slightly disagree	strongly disagree
14. On the whole, I am satisfied with myself.				
15. At times, I think I am no good at all (*).				
16. I feel that I have a number of good qualities.				
17. I feel I do not have much to be proud of (*).				
18. I am able to do things as well as most other people.				
19. I certainly feel useless at times (*).				
20. I feel I'm a person of worth, at least on an equal plane with others.				
21. I wish I could have more respect for myself (*).				
22. I take a positive attitude toward myself.				
23. All in all, I am inclined to feel that I am a failure (*).				

Locate three persons you know well and assign each person to one of the following column. Compare your life with each person for each of the following ambit. Sign, for each ambit and for each person, one of the following symbols according to comparison you have made:			Person		
			1	2	3
+ better	= same	- worst			
24. my general life is:					
25. the way I usually spend spare-time is:					
26. my life style is:					
27. my independence and freedom are:					
28. my family situation is:					
29. my friendships are:					

AStrIS 4 – THE IMPORTANCE OF QUALITY-OF-LIFE DIMENSIONS IN CITIZENS' PREFERENCES: AN EXPERIMENTAL APPLICATION OF CONJOINT ANALYSIS

From your family you receive:	No	Yes	From your friends you receive:	No	Si
30. financial support	<input type="checkbox"/>	<input type="checkbox"/>	33. financial support	<input type="checkbox"/>	<input type="checkbox"/>
31. psychological support	<input type="checkbox"/>	<input type="checkbox"/>	34. psychological support	<input type="checkbox"/>	<input type="checkbox"/>
32. study support	<input type="checkbox"/>	<input type="checkbox"/>	35. study support	<input type="checkbox"/>	<input type="checkbox"/>

	Ambiti	Ordine
<p>Put the following individual life aspects in order, from the one you believe is the most important (1) to the one you consider the less important (10). (Don't assign the same rank to two different ambits)</p>	36. the earning	<input type="checkbox"/>
	37. the career	<input type="checkbox"/>
	38. the family	<input type="checkbox"/>
	39. the neighbors	<input type="checkbox"/>
	40. the friends	<input type="checkbox"/>
	41. physical aspect	<input type="checkbox"/>
	42. the financial independence	<input type="checkbox"/>
	43. the ideals	<input type="checkbox"/>
	44. the health	<input type="checkbox"/>
	45. the partner	<input type="checkbox"/>

In comparison with the last year, you feel	less	same	more
	satisfied		
46. your general life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. the friendships	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. the family relations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. the health of your family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50. the financial situation of your family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. your financial situation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52. your spare-time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53. your health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54. your work/study activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55. your inner life well-being	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

56. Image that each of the following columns represents a group of persons that live in a similar way. People of the first column have rare kind of life; on the contrary, people of the sixth column have a very common life. Sing the column in which column you insert your life.

☐
☐
☐
☐
☐
☐



**57. Which spare-time activity you usually carry out? (Sign only the prevalent activity)**

Sport	Do-it-yourself works
Cinema/Theater	Voluntary activities
Readings	Other
Artistic activities (painting, music, dance, acting, ...)	No one





**58. You usually carry out spare-time activities with (sign only one):**

by yourself	brother/sister
friends	colleagues
parents	others

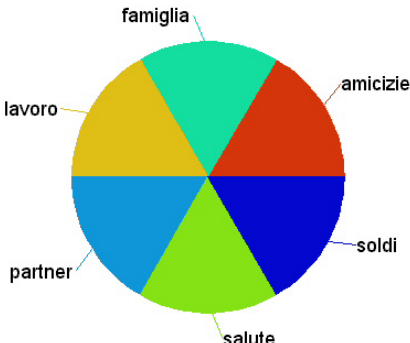
In your opinion, carrying out spare-time activities:

	I agree	I disagree
59. contributes to the well-being		
60. develop and improve creativity		
61. develops the intellectual capacities		
62. helps to increase the individual self-esteem		
63. contributes to the individual psycho-physical well-being		
64. helps to reduce racist behaviours		
65. contributes to the reduce violent behaviours		
66. increases life satisfaction		
67. improves quality of life		
68. helps to express personal feelings		
69. contributes to relax and to decrease the stress		

**70. Point out the figure that better represents the way you see your future.**

						
a	b	c	d	e	f	g

**71. In each of the following segment, representing a ambit of your life, sign the symbol (among that presented below) that better represents the way you see the future.**

		<p>             + + + very positive              + + quite positive              + positive              - negative              - - quite negative              - - - very negative           </p>
--	---	---

AStrIS 4 – THE IMPORTANCE OF QUALITY-OF-LIFE DIMENSIONS IN CITIZENS' PREFERENCES: AN  
EXPERIMENTAL APPLICATION OF CONJOINT ANALYSIS

For each couple of means of transport, Sign a cross near the means of transports that, between the two defining each couple, you prefer for your moving in your town				
72.	Bus	<input type="checkbox"/>	<input type="checkbox"/>	Car
73.	Car	<input type="checkbox"/>	<input type="checkbox"/>	On foot
74.	On foot	<input type="checkbox"/>	<input type="checkbox"/>	Bycicle
75.	Bicycle	<input type="checkbox"/>	<input type="checkbox"/>	Scooter
76.	Scooter	<input type="checkbox"/>	<input type="checkbox"/>	On foot
77.	Bus	<input type="checkbox"/>	<input type="checkbox"/>	Bycicle
78.	Car	<input type="checkbox"/>	<input type="checkbox"/>	Scooter
79.	On foot	<input type="checkbox"/>	<input type="checkbox"/>	Bus
80.	Bicycle	<input type="checkbox"/>	<input type="checkbox"/>	Car
81.	Scooter	<input type="checkbox"/>	<input type="checkbox"/>	Bus

For each couple of adjectives, point out the position that is closet to the adjectives that better describes your town.									
82.	stimulating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	depressing
83.	dynamic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	static
84.	innovating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	traditionalist
85.	organized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disorganized
86.	cheap	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	expensive
87.	young	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	old
88.	clam	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	excited
89.	hospitable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	inhospitable
90.	strong	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	weak
91.	interesting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	meaningless
92.	comfortable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	uncomfortable
93.	tidy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	chaotic
94.	concret	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	abstract
95.	fair	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	unfair
96.	silent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	noisy
97.	beautiful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ugly
98.	secure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	dangerous
99.	pleasant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	unpleasant
100.	positive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	negative
101.	relaxing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	stressful
102.	open	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	close

103. Observe the following four sets of pictures (A, B, C, D); the sets represent four different combinations of different situations of relations (family, neighborhoods, interpersonal and at work).

Set the four series in orders from the one you prefer more (1) to the one you prefer less (4).

A: rank \_\_\_\_

B: rank \_\_\_\_

C: rank \_\_\_\_

D: rank \_\_\_\_

**A**

**B**



**C**

**D**

104. Observe the following four sets of pictures (A, B, C, D); the sets represent four different combinations of different situations of urban environment (green, quality of water, roads maintenance, urban lightning).

Set the four series in orders from the one you prefer more (1) to the one you prefer less (4).

A: rank \_\_\_\_

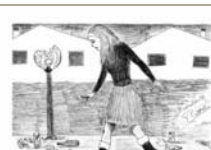
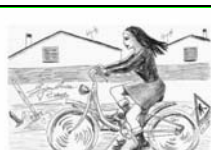
B: rank \_\_\_\_

C: rank \_\_\_\_

D: rank \_\_\_\_

**A**

**B**



**C**

**D**

105. Observe the following four sets of descriptions (A, B, C, D); the sets represent four different combinations of different situations of urban services (public transports, access to the town center, surveillance).

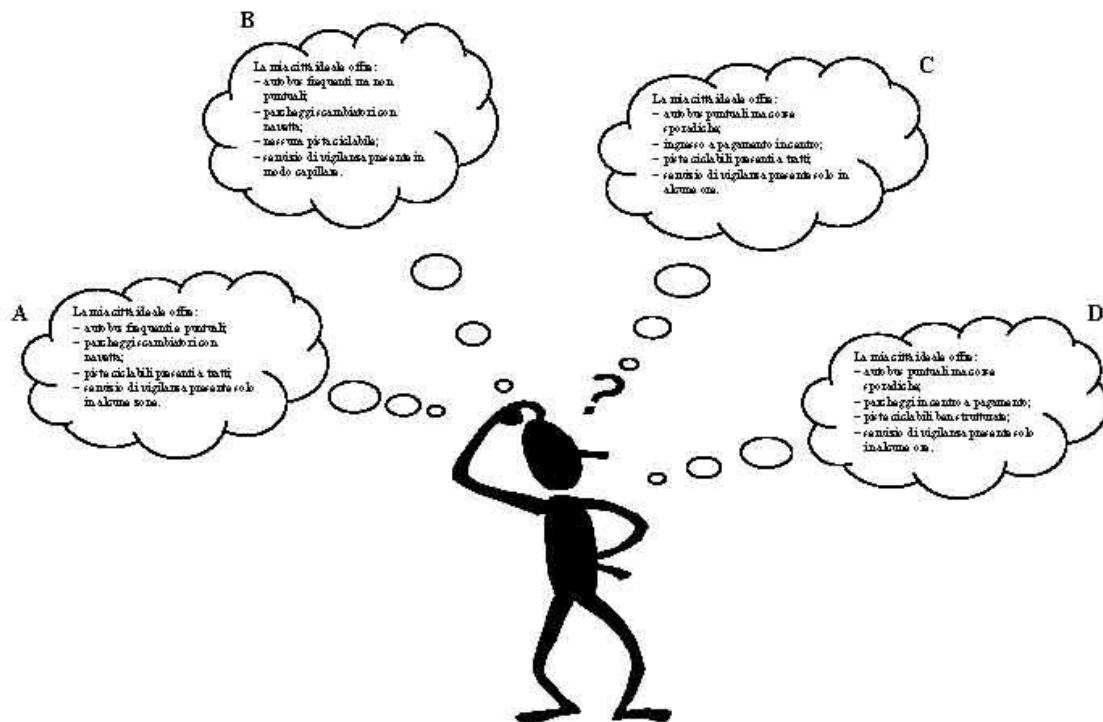
Set the four series in orders from the one you prefer more (1) to the one you prefer less (4).

A: rank \_\_\_\_

B: rank \_\_\_\_

C: rank \_\_\_\_

D: rank \_\_\_\_



106. Observe the following four sets of descriptions (A, B, C, D); the sets represent four different combinations of different situations of cultural-economic offers (tourist presence, presence of artistic structures, high-education proposals, quality and advantage of commercial products).  
Set the four series in orders from the one you prefer more (1) to the one you prefer less (4).

A: rank \_\_\_\_

B: rank \_\_\_\_

C: rank \_\_\_\_

D: rank \_\_\_\_



















# B. THE DEFINITION OF THE STIMULI

Ambit: RELATIONS				
Factors and related levels				
	Family relations	Neighborhood relations	Interpersonal relations	Relations with work colleagues
Stimuli	A			
	B			
	C			
	D			



AStrIS 4 – THE IMPORTANCE OF QUALITY-OF-LIFE DIMENSIONS IN CITIZENS' PREFERENCES: AN EXPERIMENTAL APPLICATION OF CONJOINT ANALYSIS

Ambit: URBAN ENVIRONMENT				
Factors and related levels				
	Urban green	Quality of the water	Roads maintenance	Urban lighting
A				
B				
C				
D				



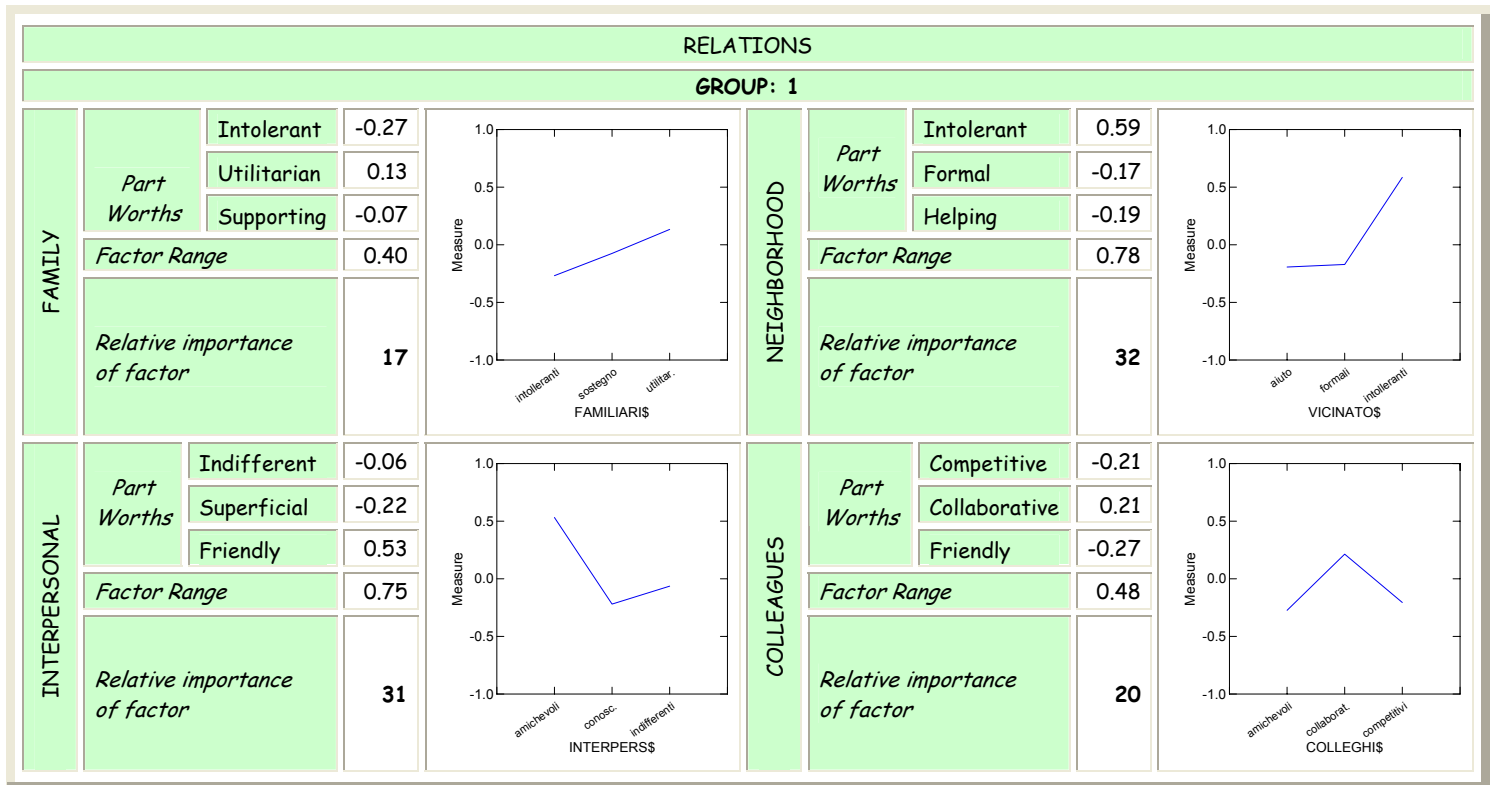
Appendix B. The definition of the Stimuli

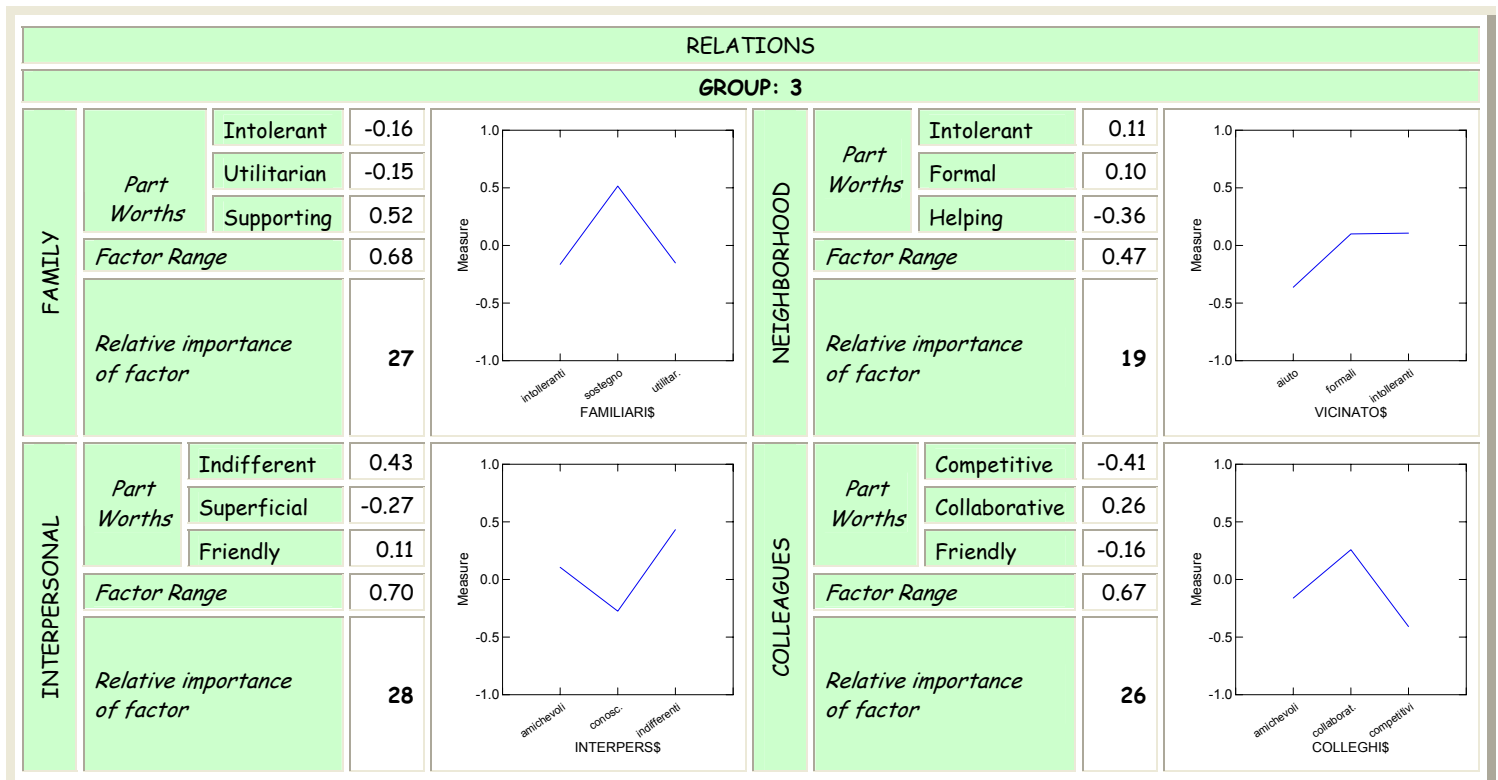
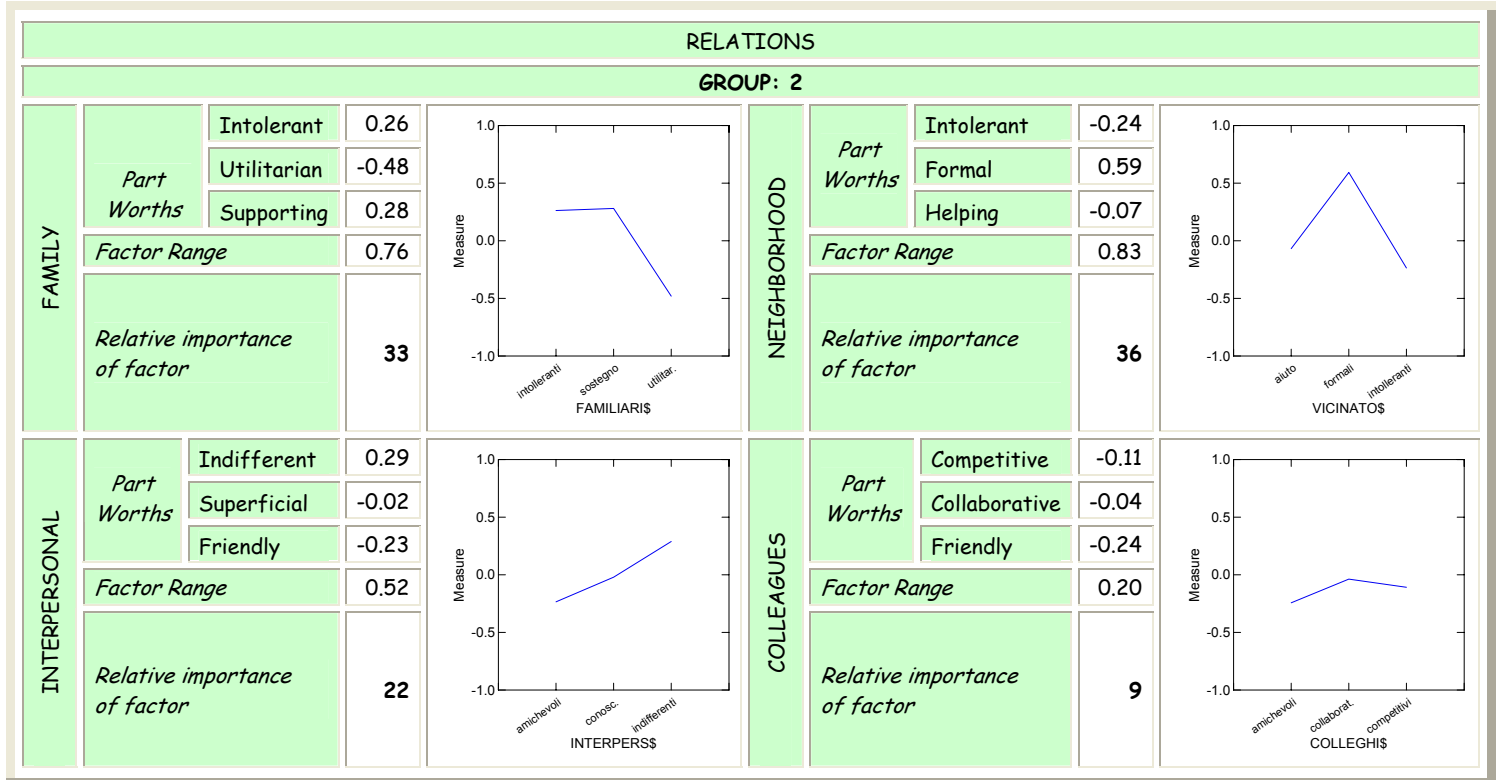
		Ambit: URBAN SERVICES			
		Factors and related levels			
		Public transports	Access to the town center	Cycle tracks	Surveillance
Stimuli	A	My ideal town offers			
		Frequent and punctual buses	Parking areas around the center and shuttles to reach the center	Rare cycle tracks	Presence of surveillance only in particular areas
	B	My ideal town offers			
		Frequent buses but not punctual	Parking areas around the center and shuttles to reach the center	No cycle track	Vast presence of surveillance
	C	My ideal town offers			
		Punctual buses but not frequent	Access to the center by ticket	Rare cycle tracks	Presence of surveillance only in particular hours
	D	My ideal town offers			
		Punctual buses but not frequent	Paying car parks in the center of the town	Cycle tracks well organized	Presence of surveillance only in particular hours

		Ambit: CULTURAL-COMMERCIAL OFFER			
		Factors and related levels			
		Tourist presence	Presence of artistic structures	High-education proposals	Quality/advantage of commercial products
Stimuli	A	My ideal town			
		Is the destination of tourists only in particular periods	Does not have museums	Has a wide proposal of high-education	Offers a vast opportunity to buy commercial products at a reasonable costs but at low quality
	B	My ideal town			
		Is continuously the destination of tourists	Has few museums	Has no high-education proposal	Offers a vast opportunity to buy commercial products at a high quality but at a very high prices
	C	My ideal town			
		Is the destination of tourists only in particular periods	Is a art town	Has a poor proposal of high-education	Offers a vast opportunity to buy commercial products at a high quality but at a very high prices
	D	My ideal town			
		Is not a tourist destination	Ha pochi musei	Has a poor proposal of high-education	Offers a vast opportunity to buy commercial products at a reasonable costs but at low quality

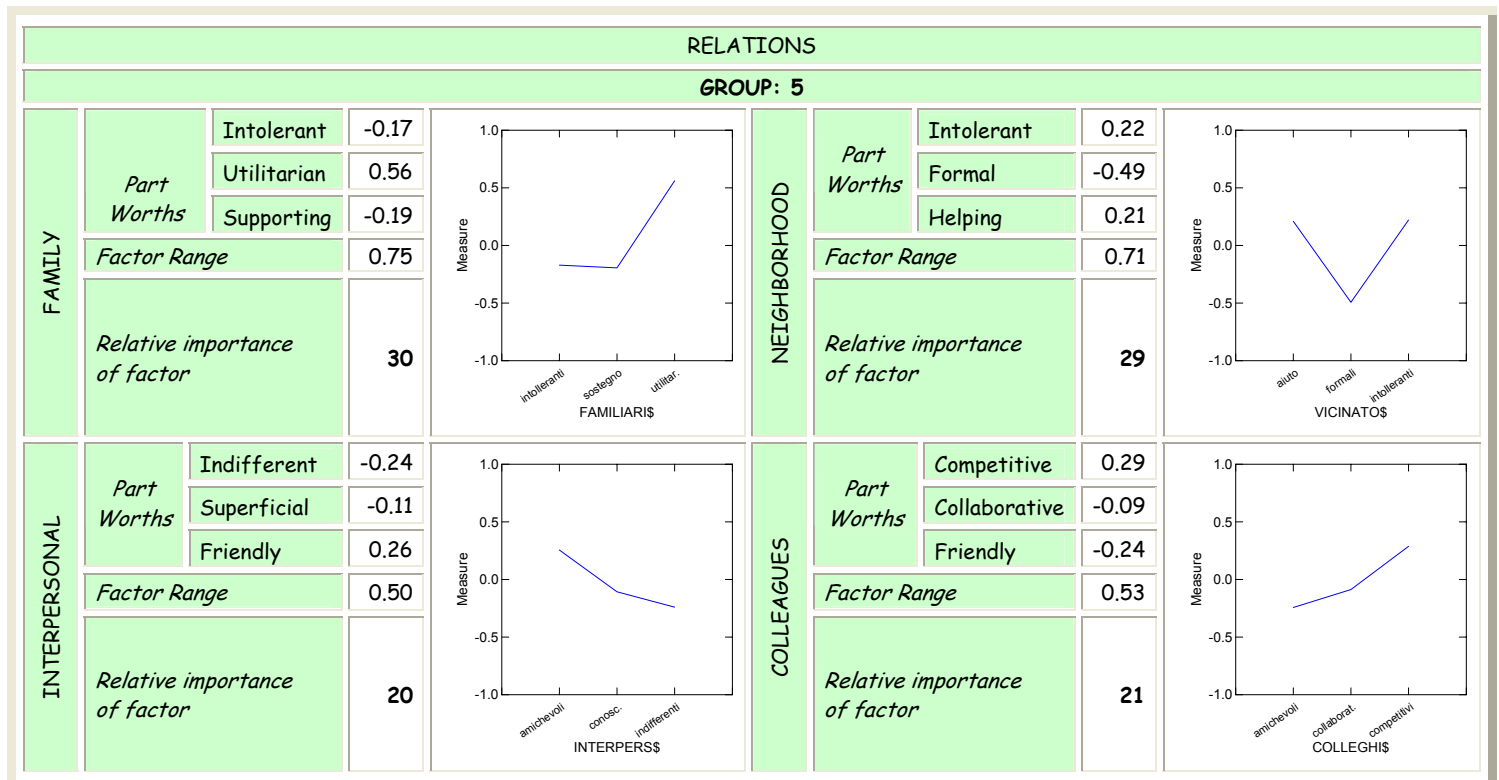
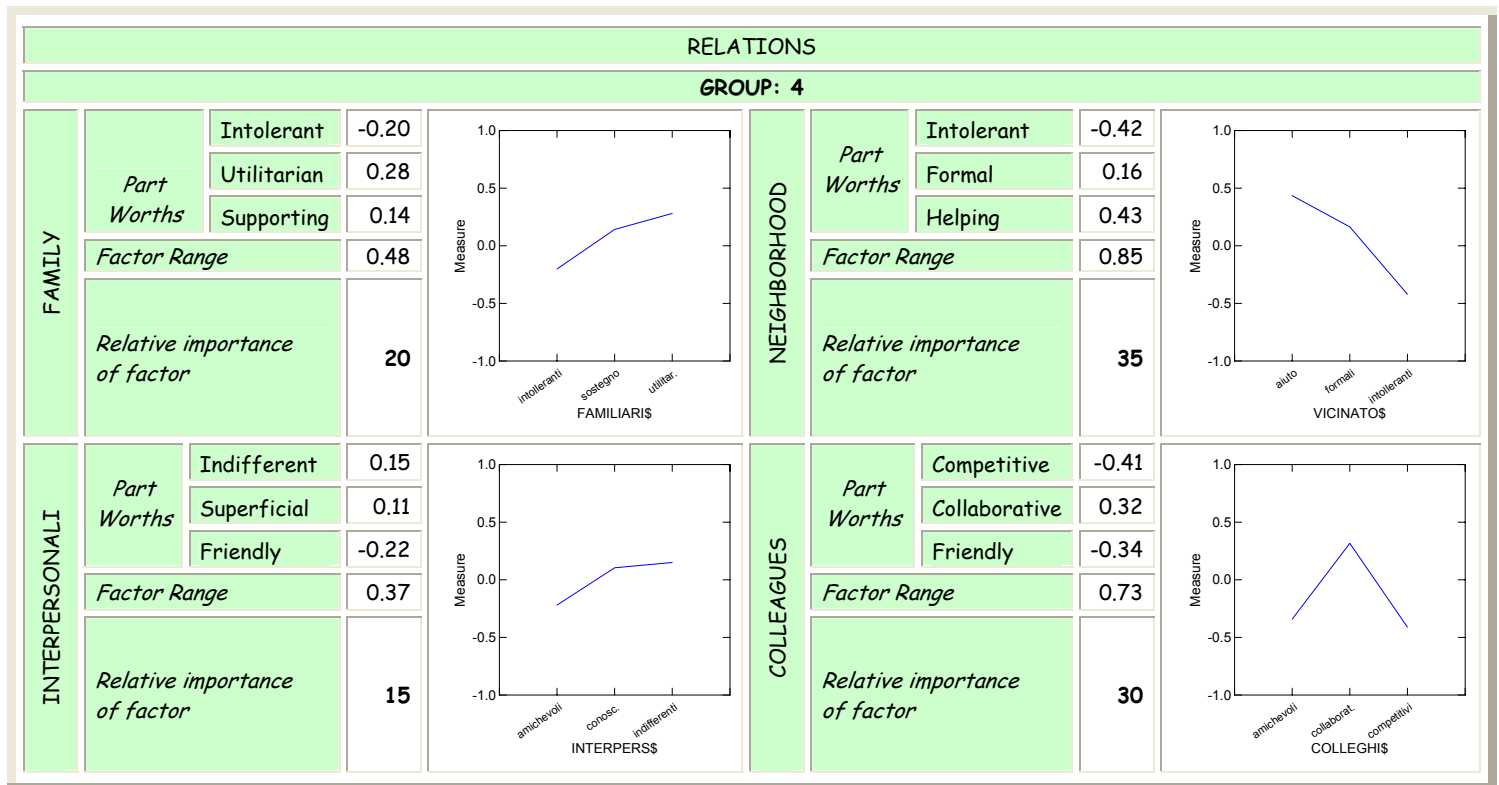
## C.DATA ANALYSIS: THE RESULTS

### C.1 AMBIT: THE RELATIONS

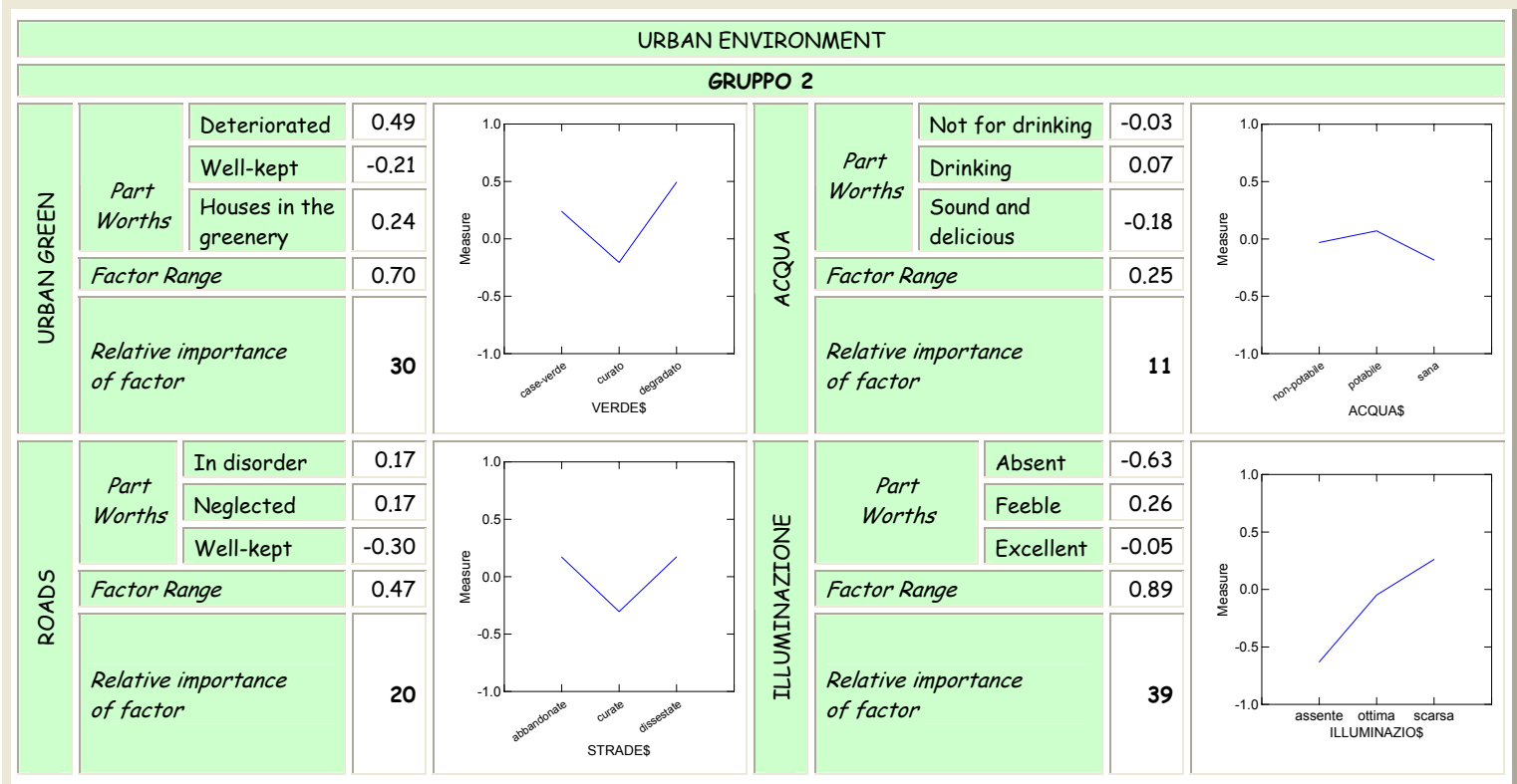
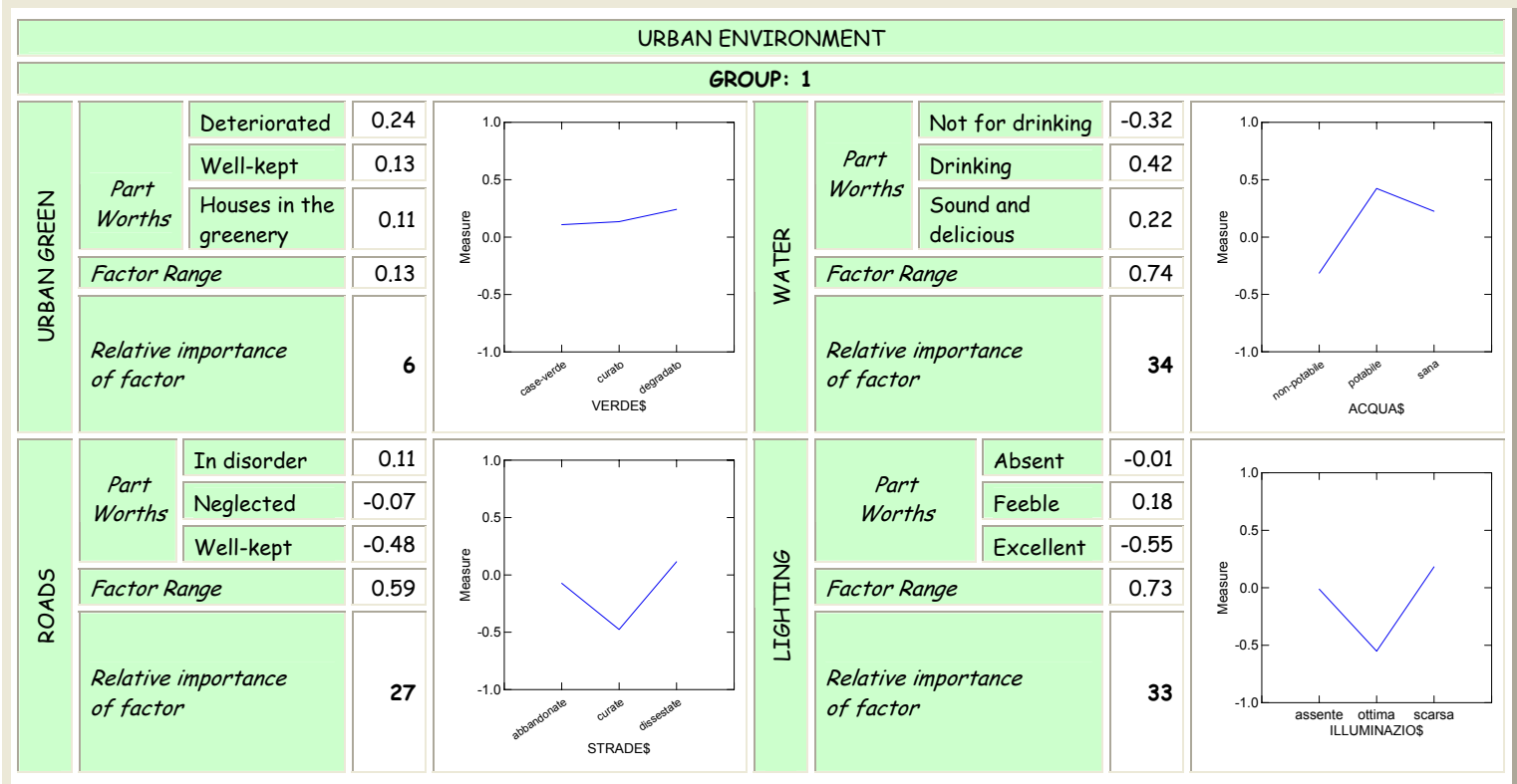




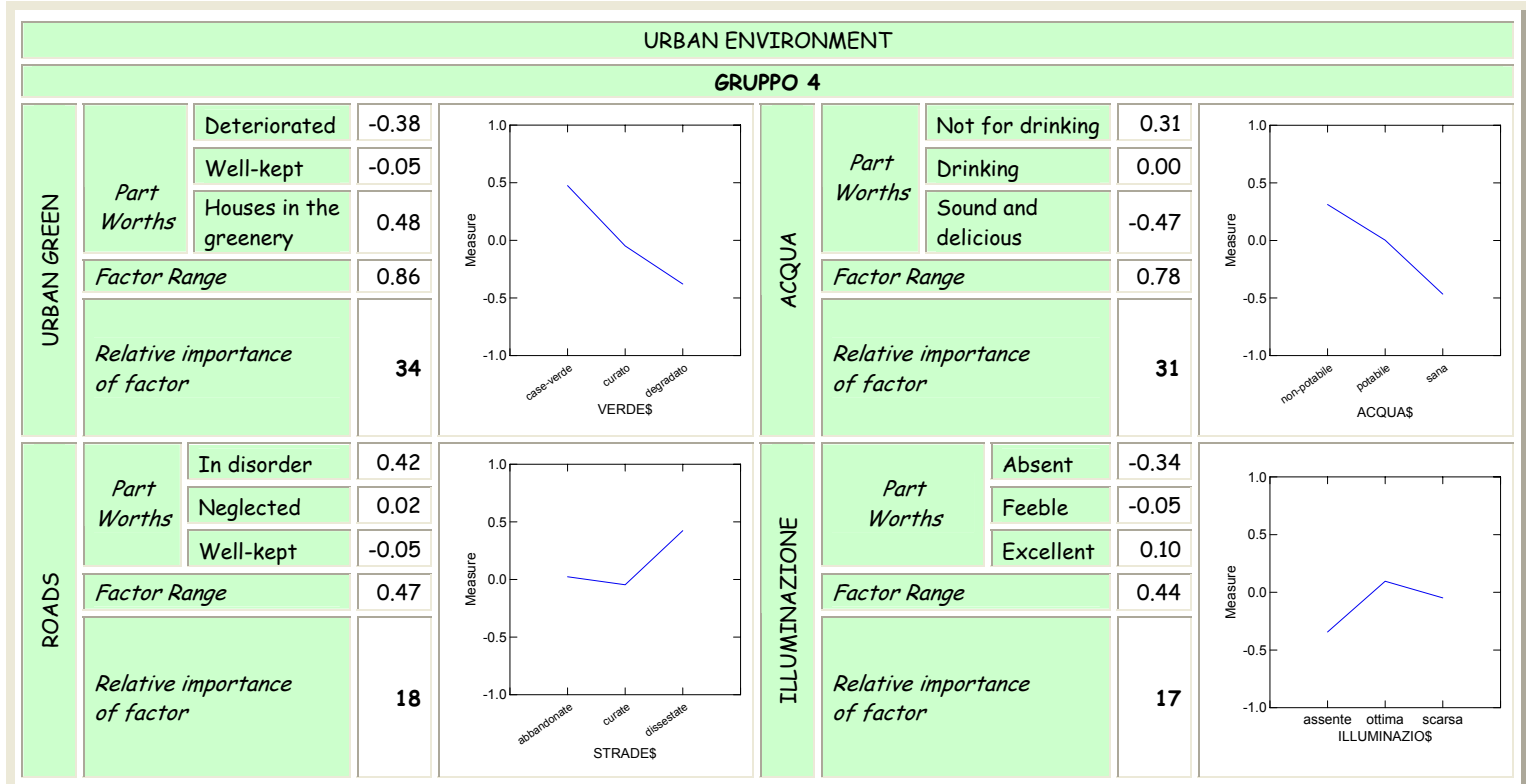
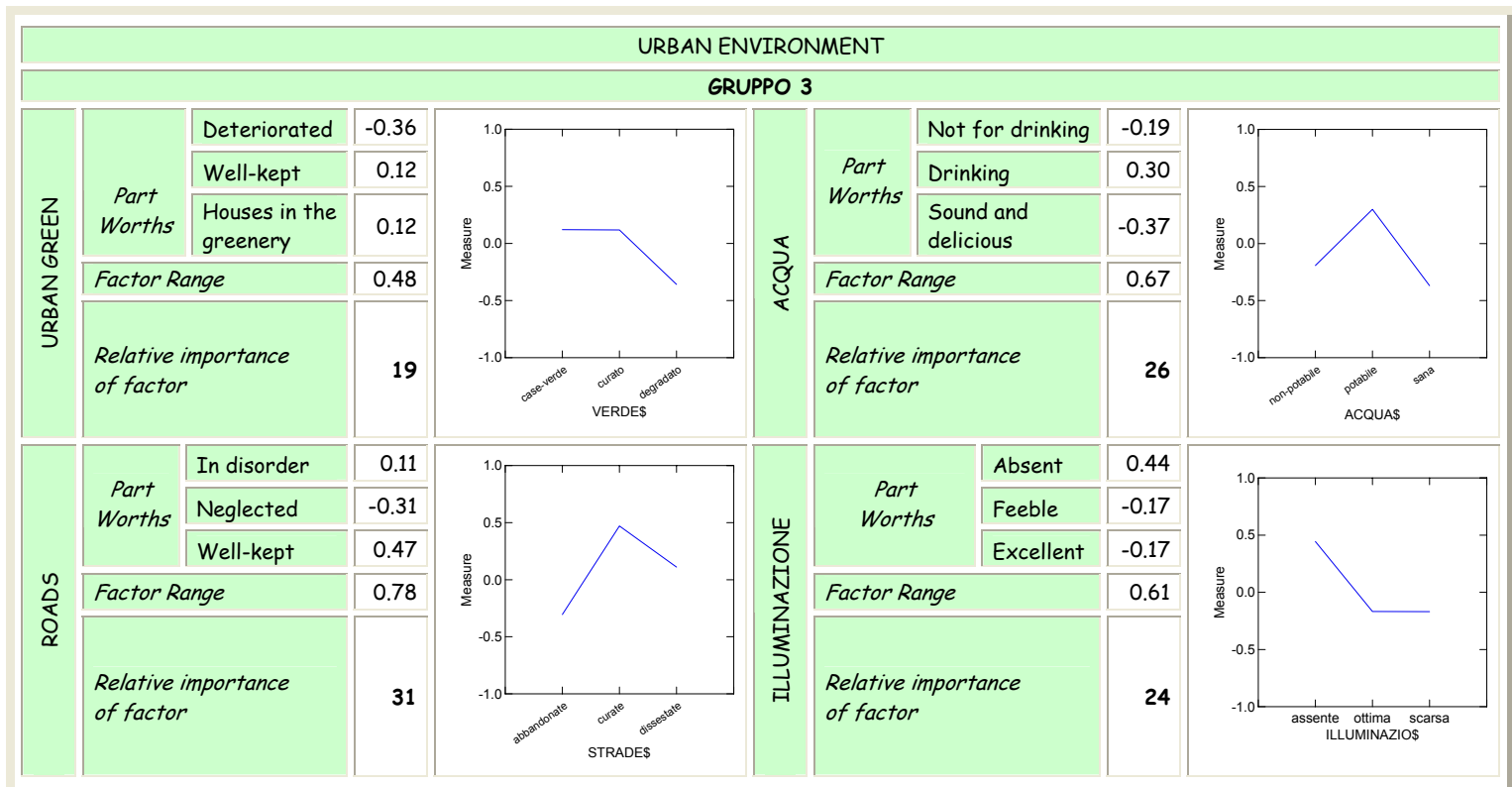
AStrIS 4 – THE IMPORTANCE OF QUALITY-OF-LIFE DIMENSIONS IN CITIZENS' PREFERENCES: AN EXPERIMENTAL APPLICATION OF CONJOINT ANALYSIS

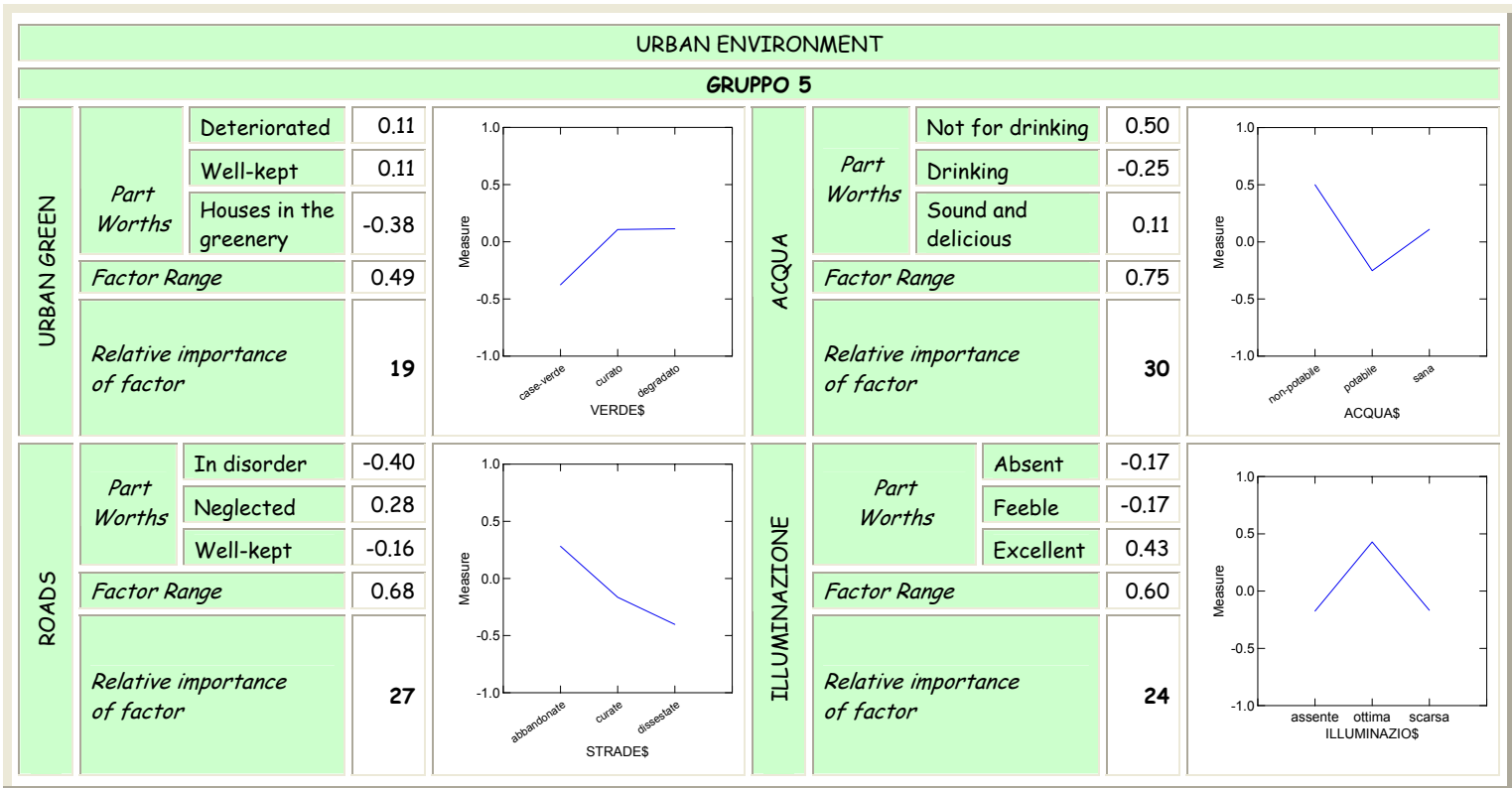


## C.2 AMBIT: THE URBAN ENVIRONMENT

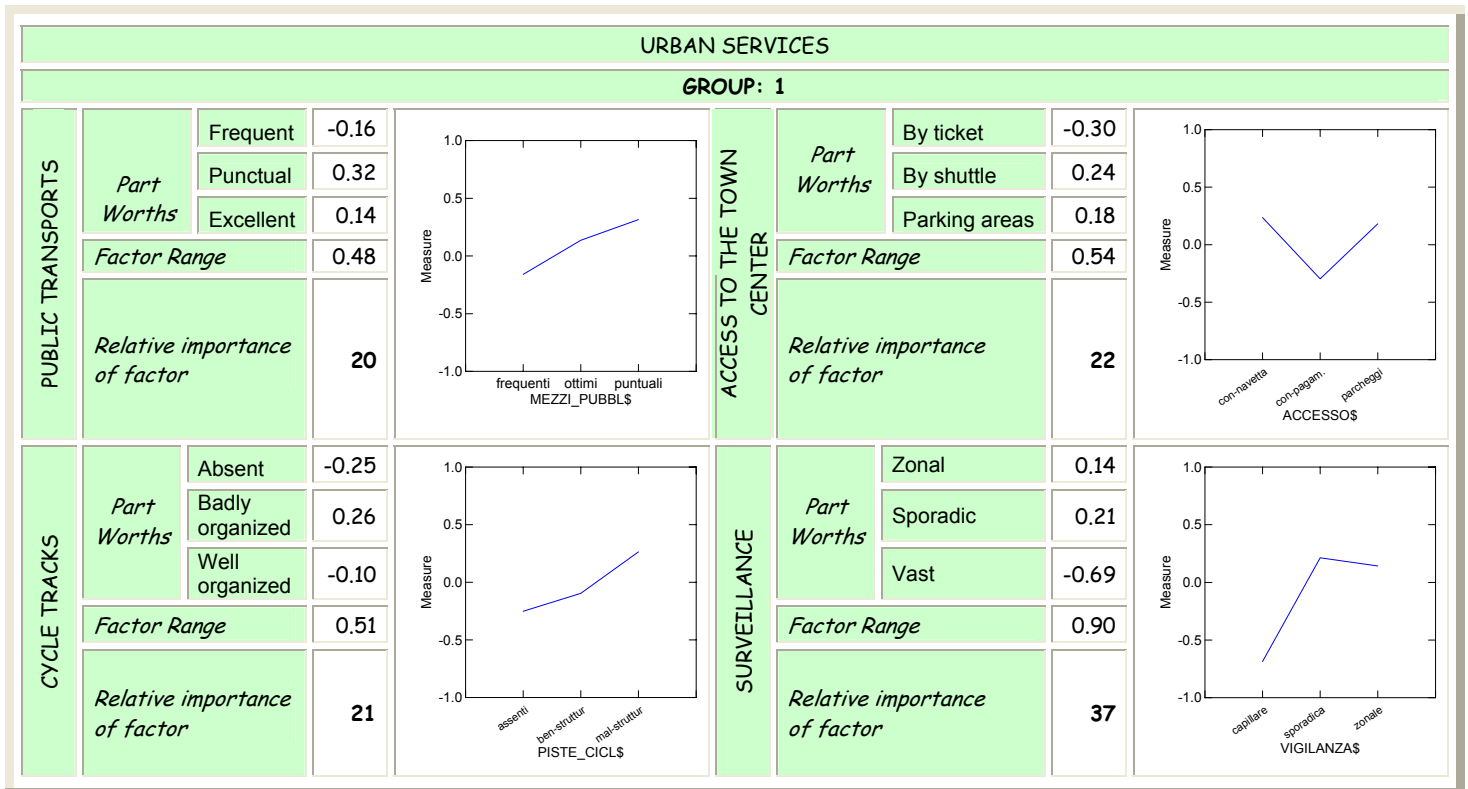


ASrIS 4 – THE IMPORTANCE OF QUALITY-OF-LIFE DIMENSIONS IN CITIZENS' PREFERENCES: AN  
EXPERIMENTAL APPLICATION OF CONJOINT ANALYSIS

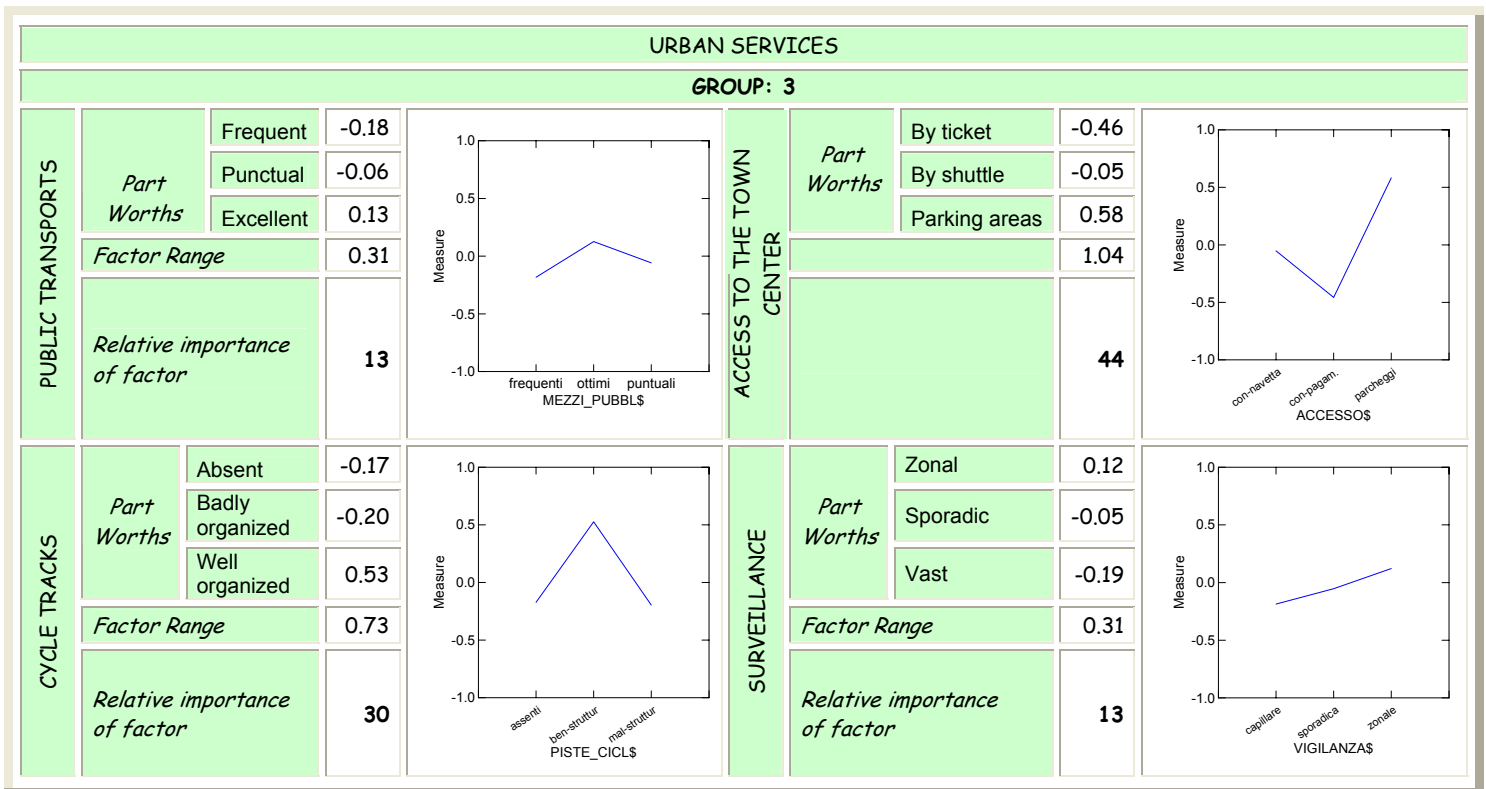
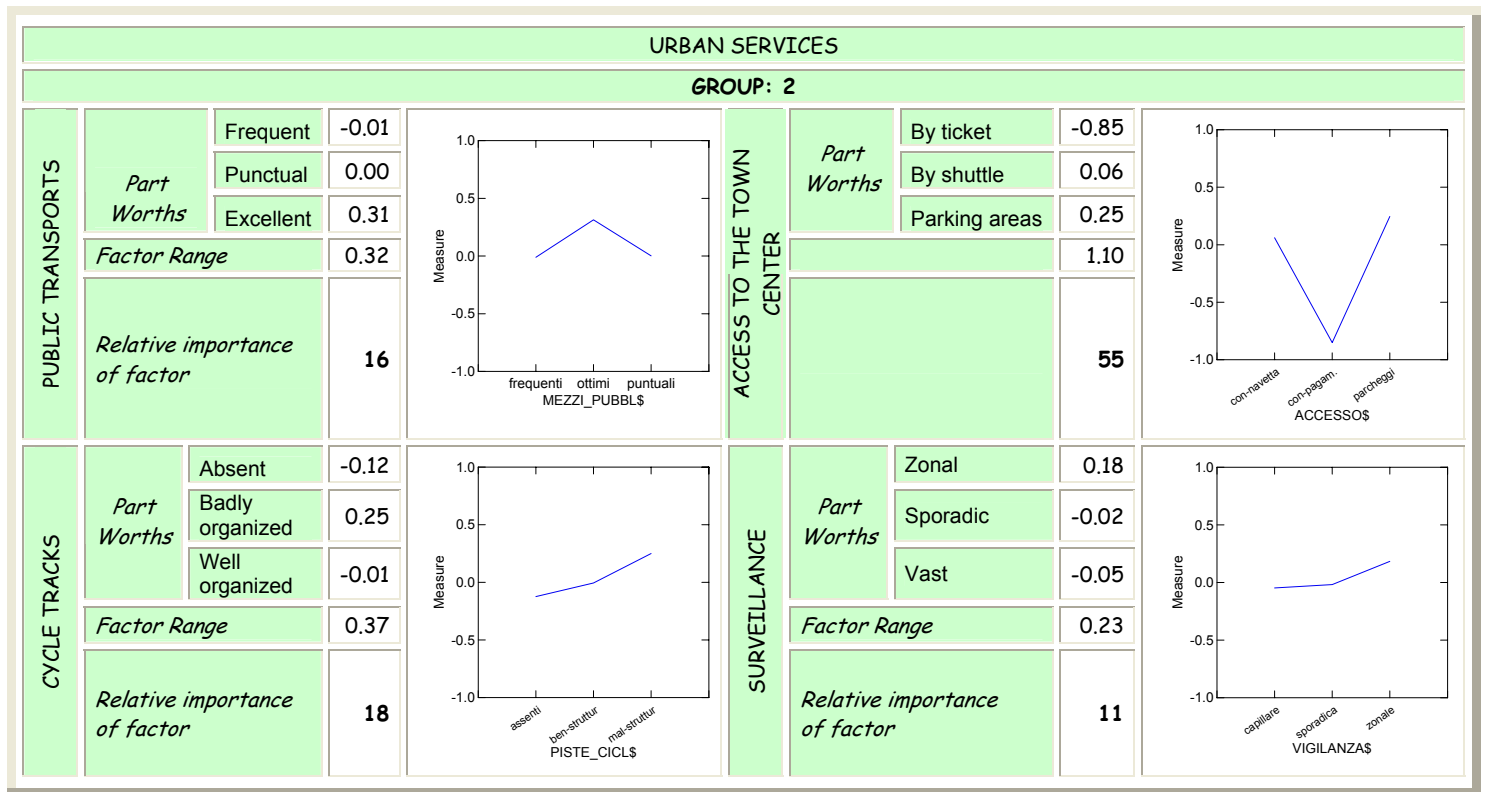




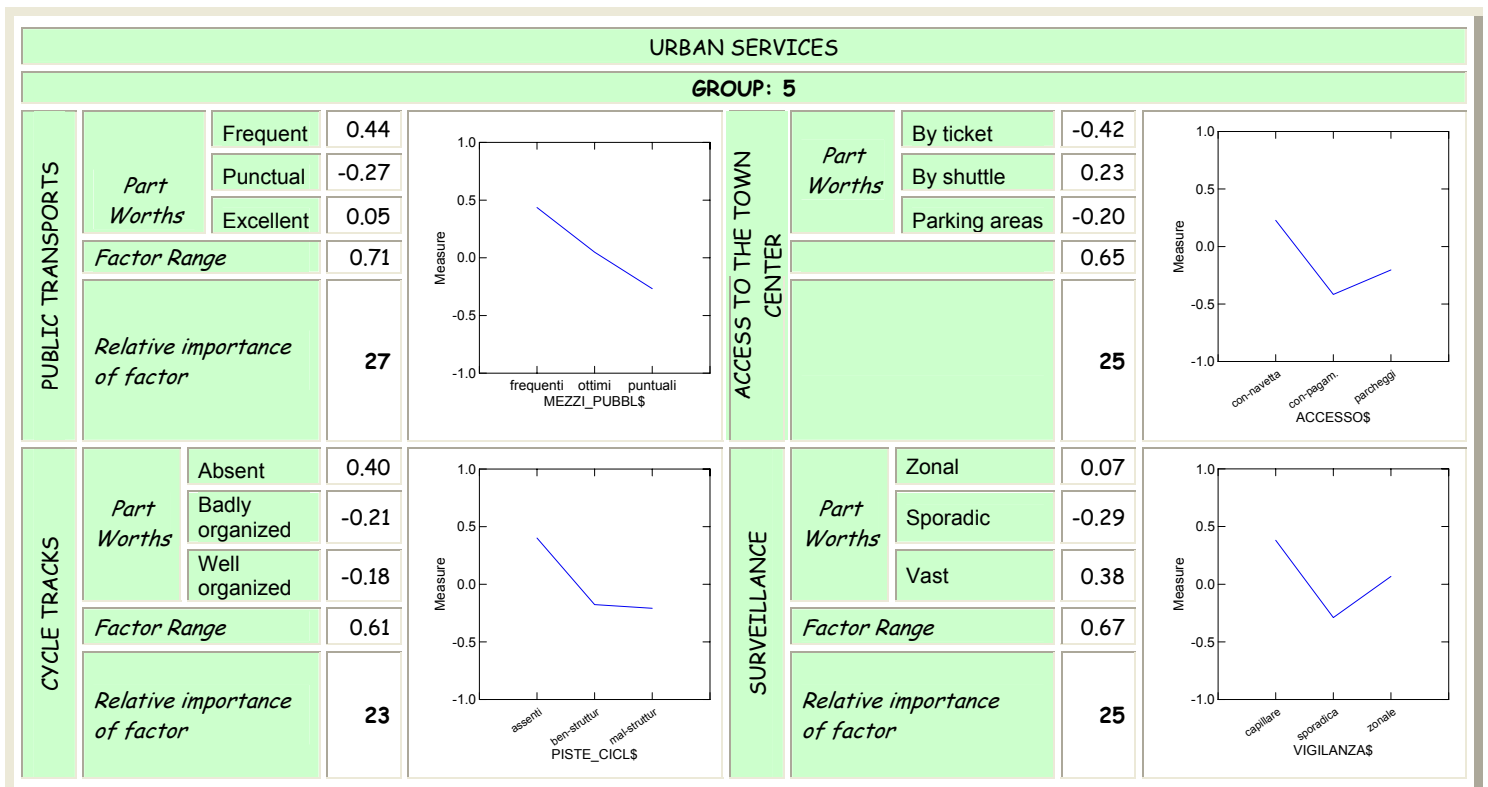
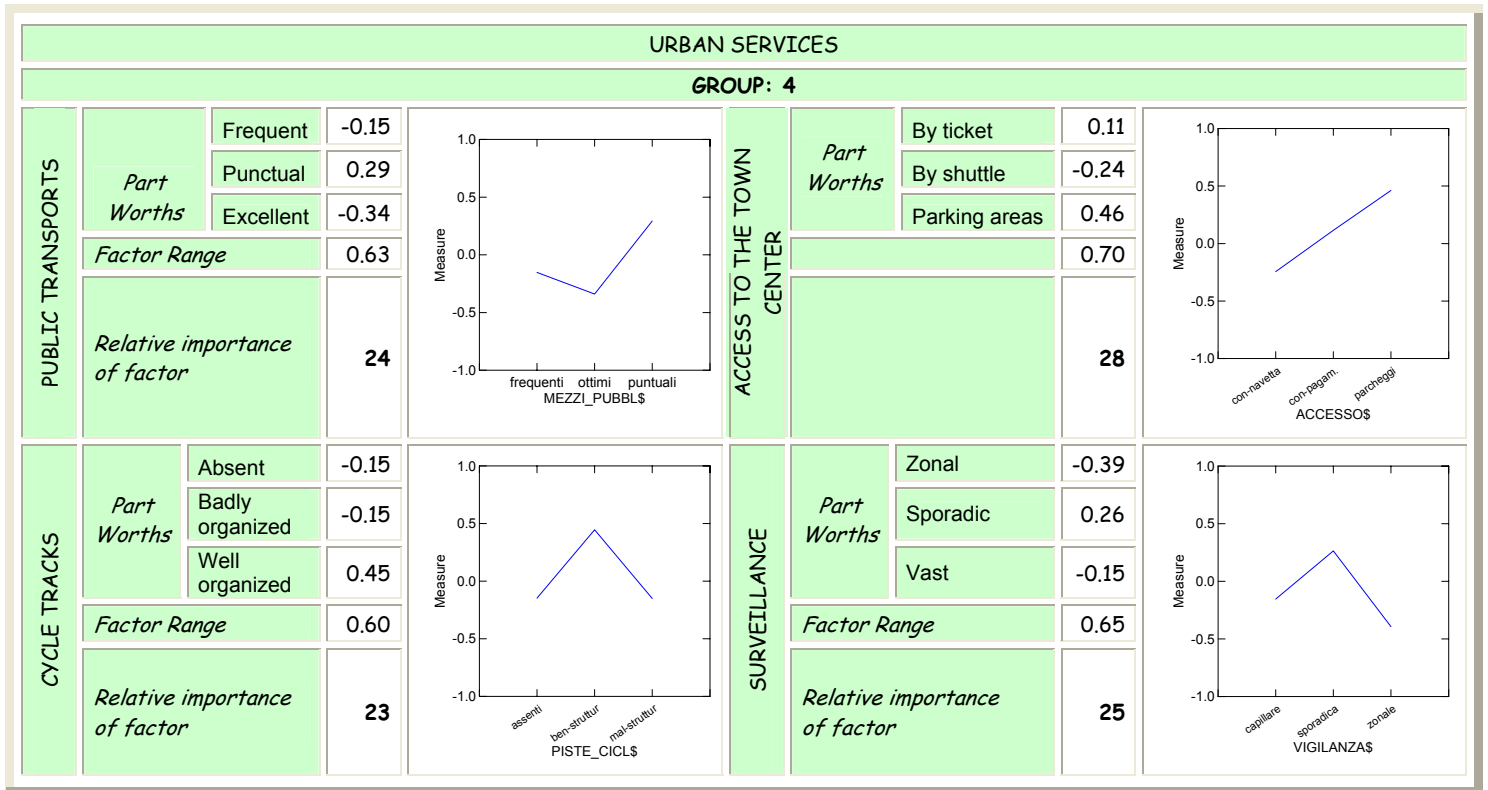
### C.3 AMBIT: THE URBAN SERVICES



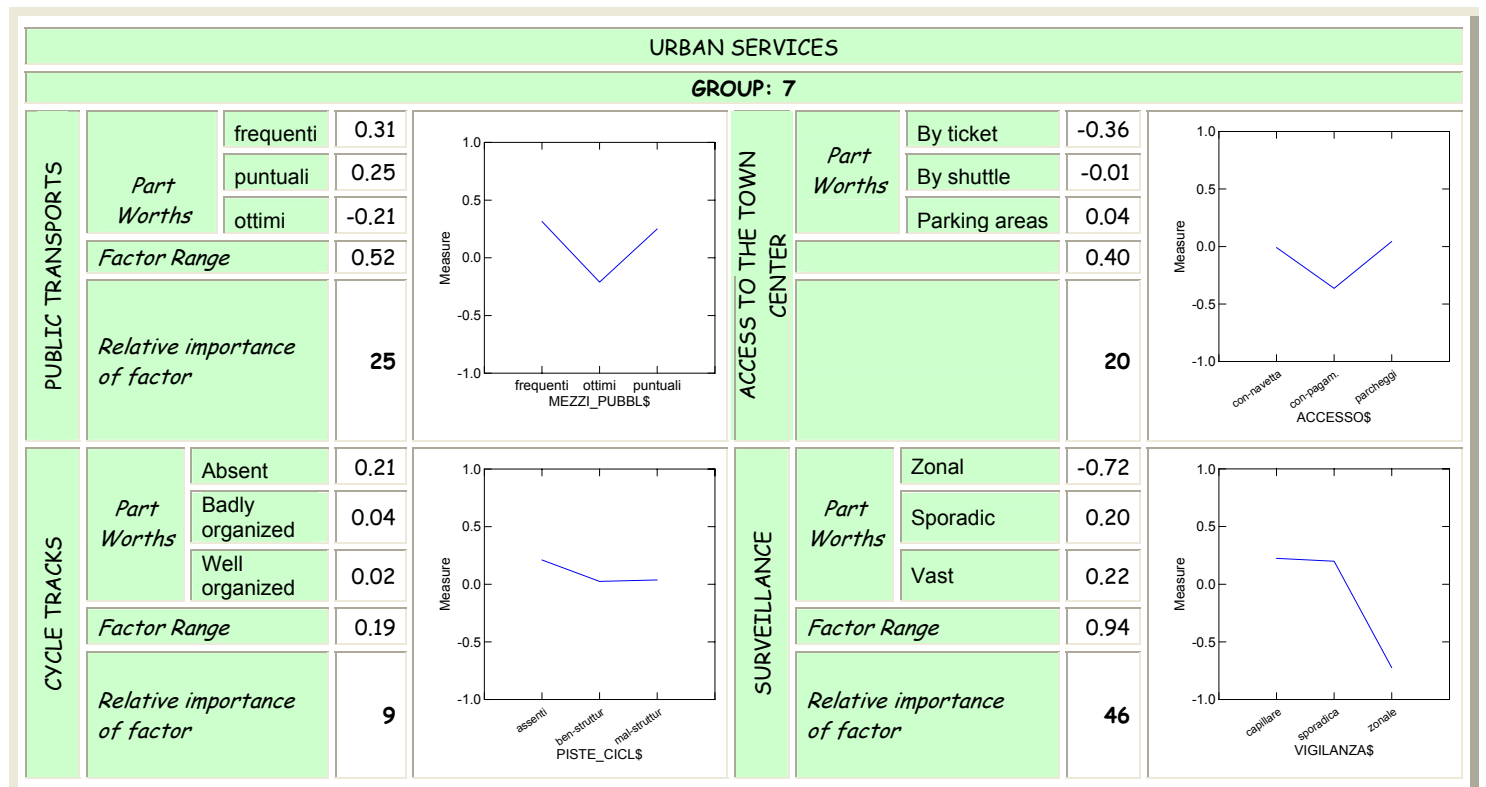
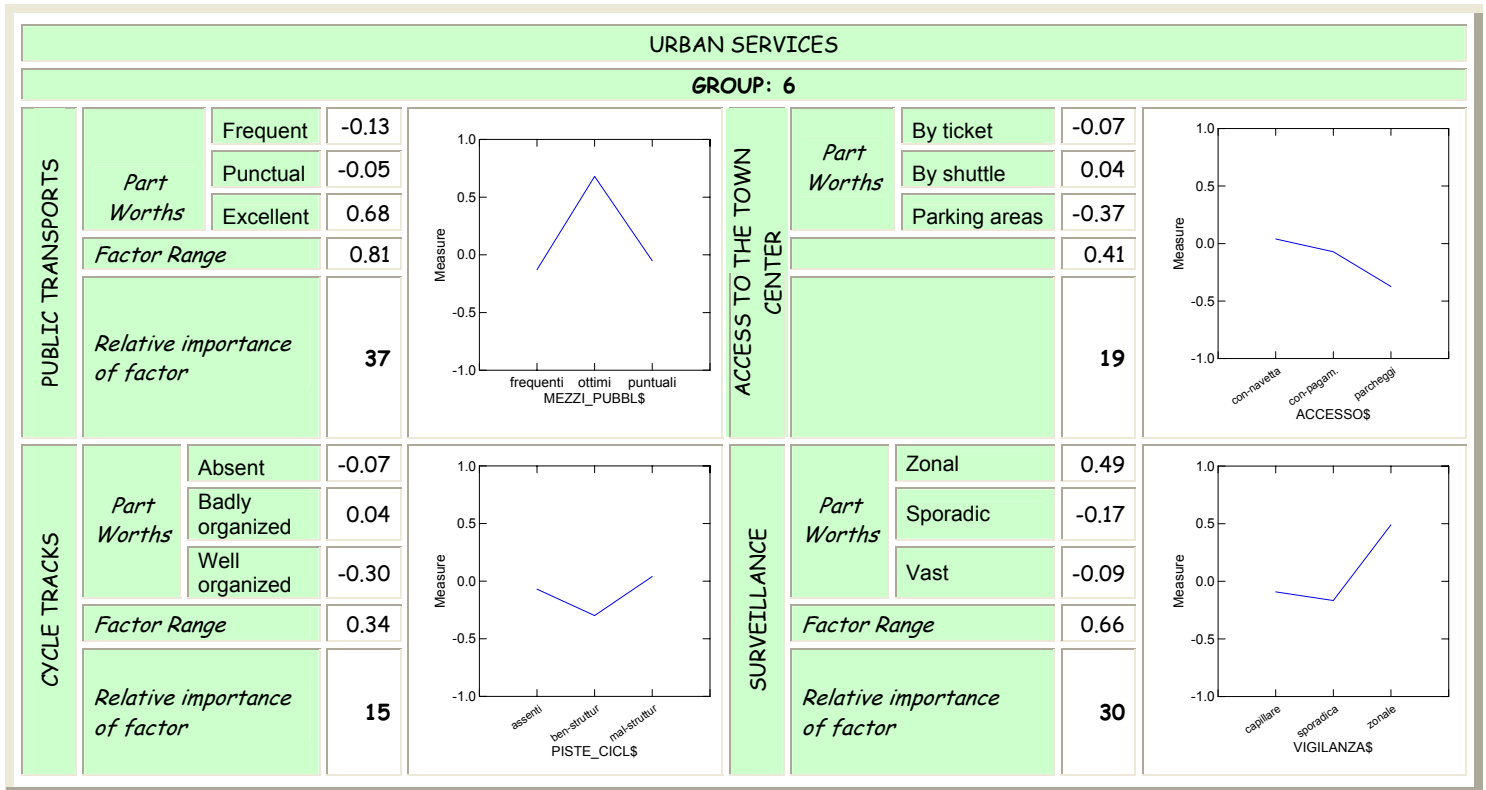
AStrIS 4 – THE IMPORTANCE OF QUALITY-OF-LIFE DIMENSIONS IN CITIZENS' PREFERENCES: AN EXPERIMENTAL APPLICATION OF CONJOINT ANALYSIS



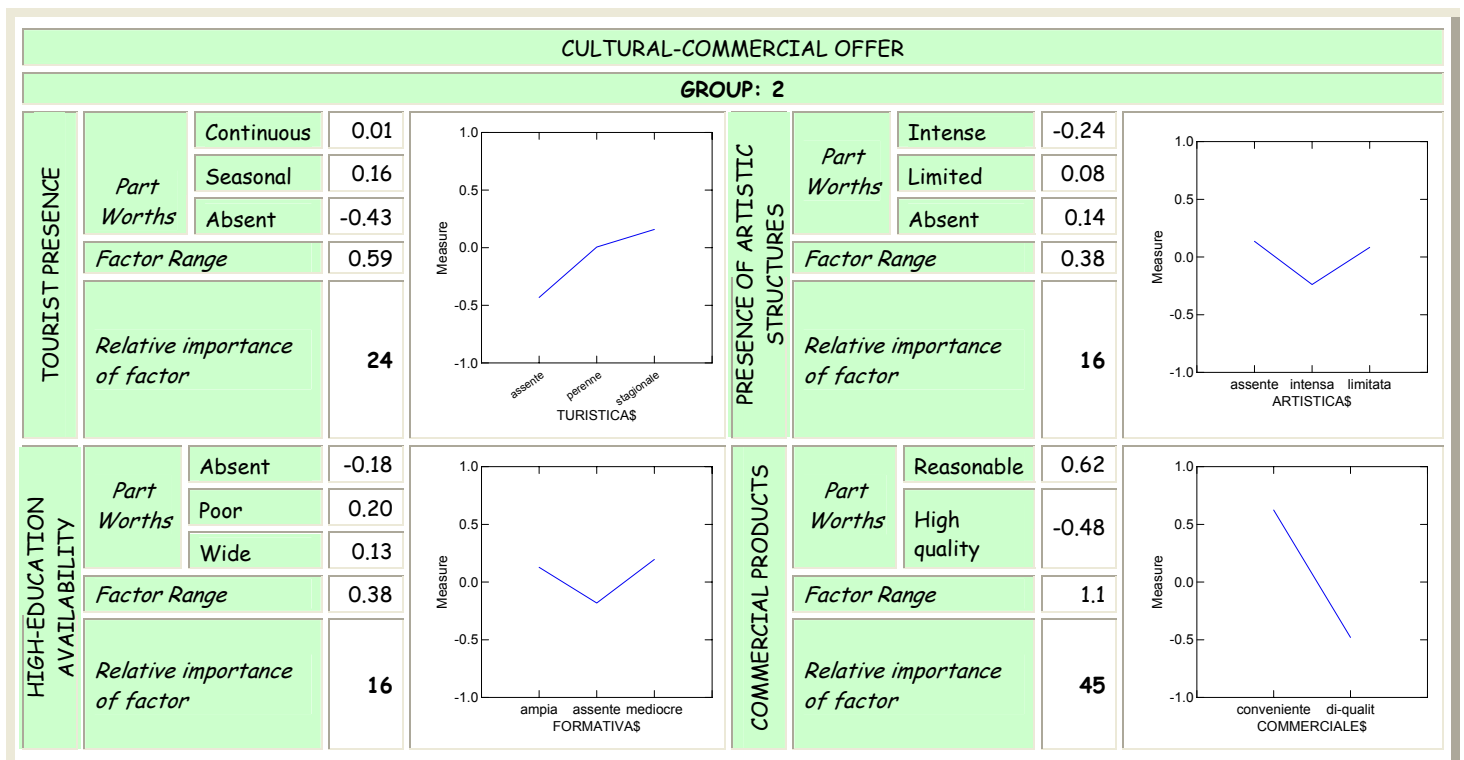
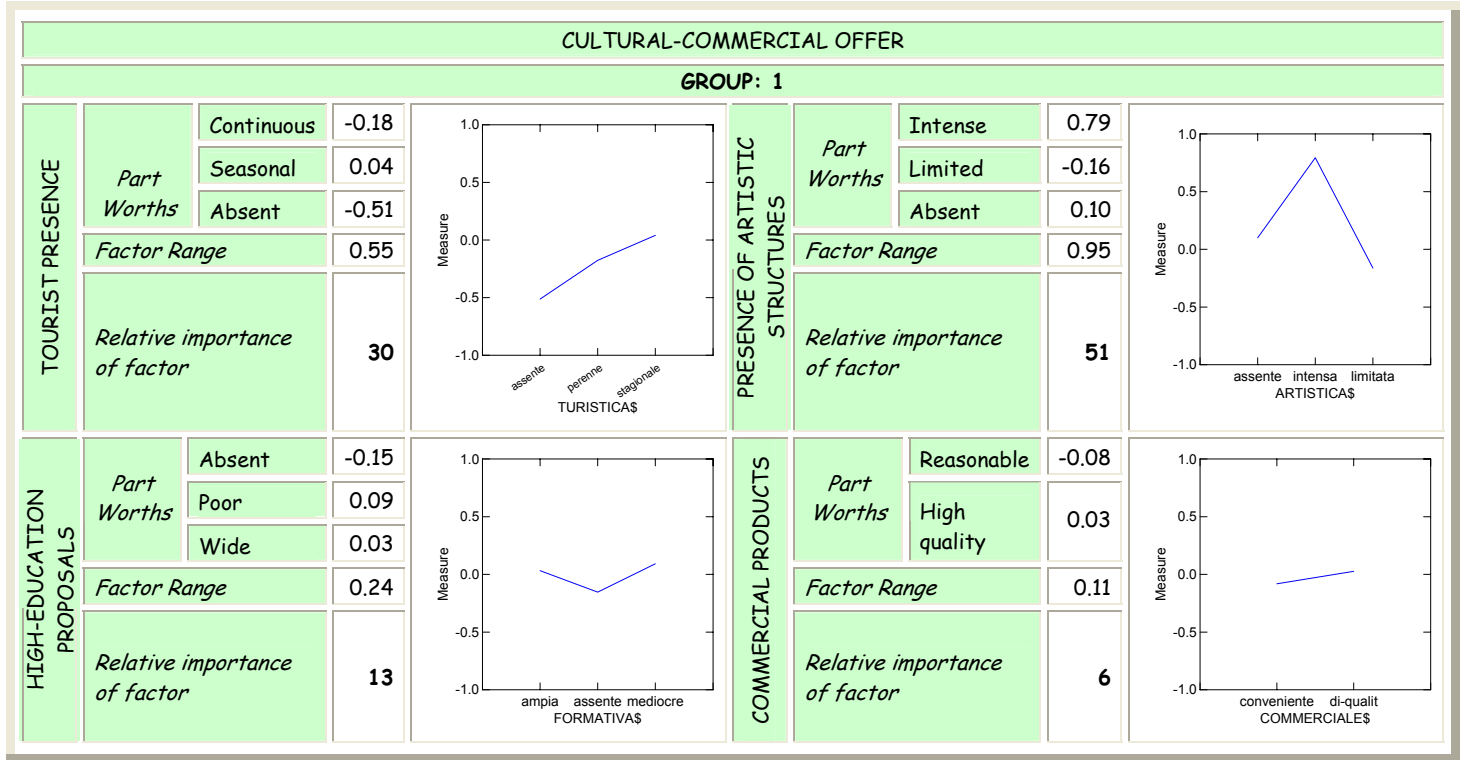




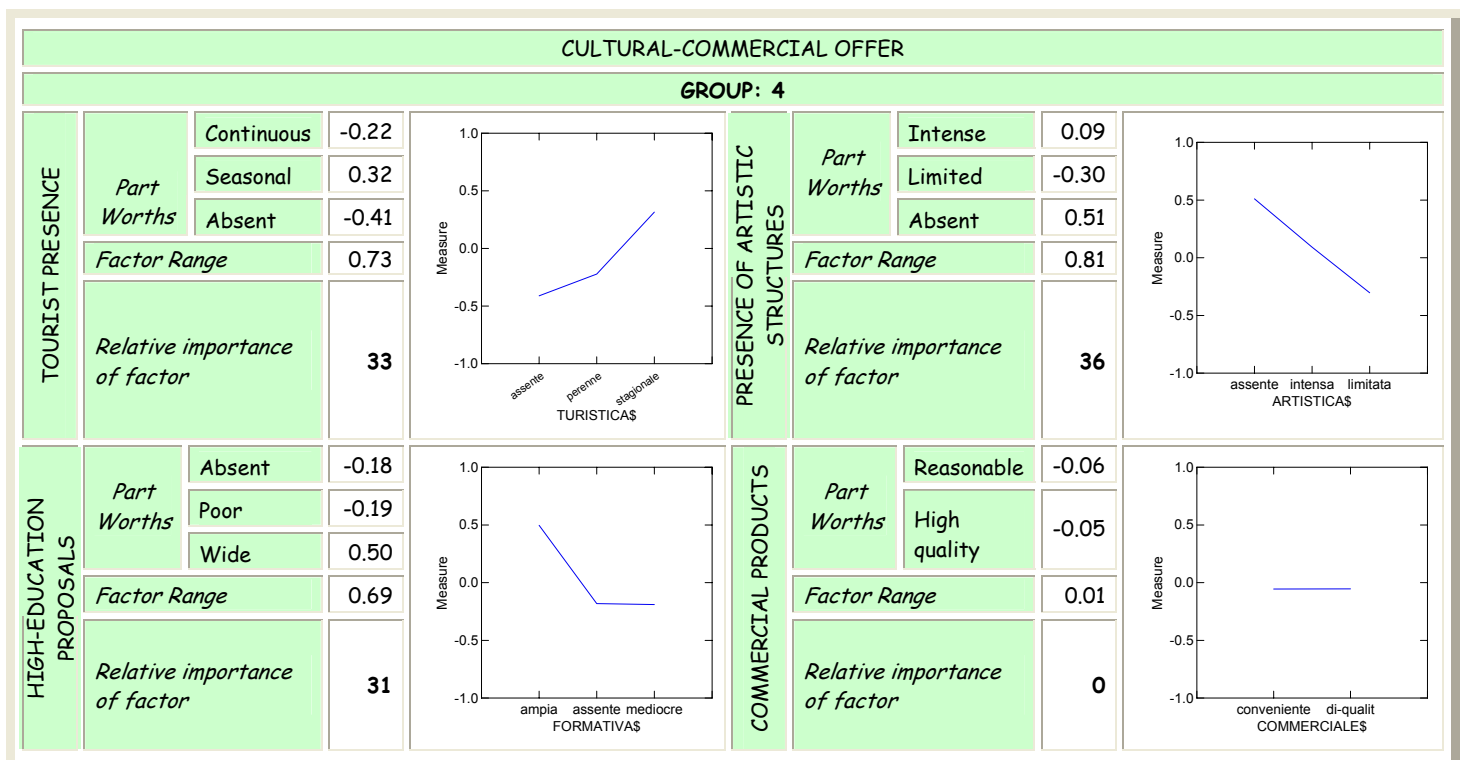
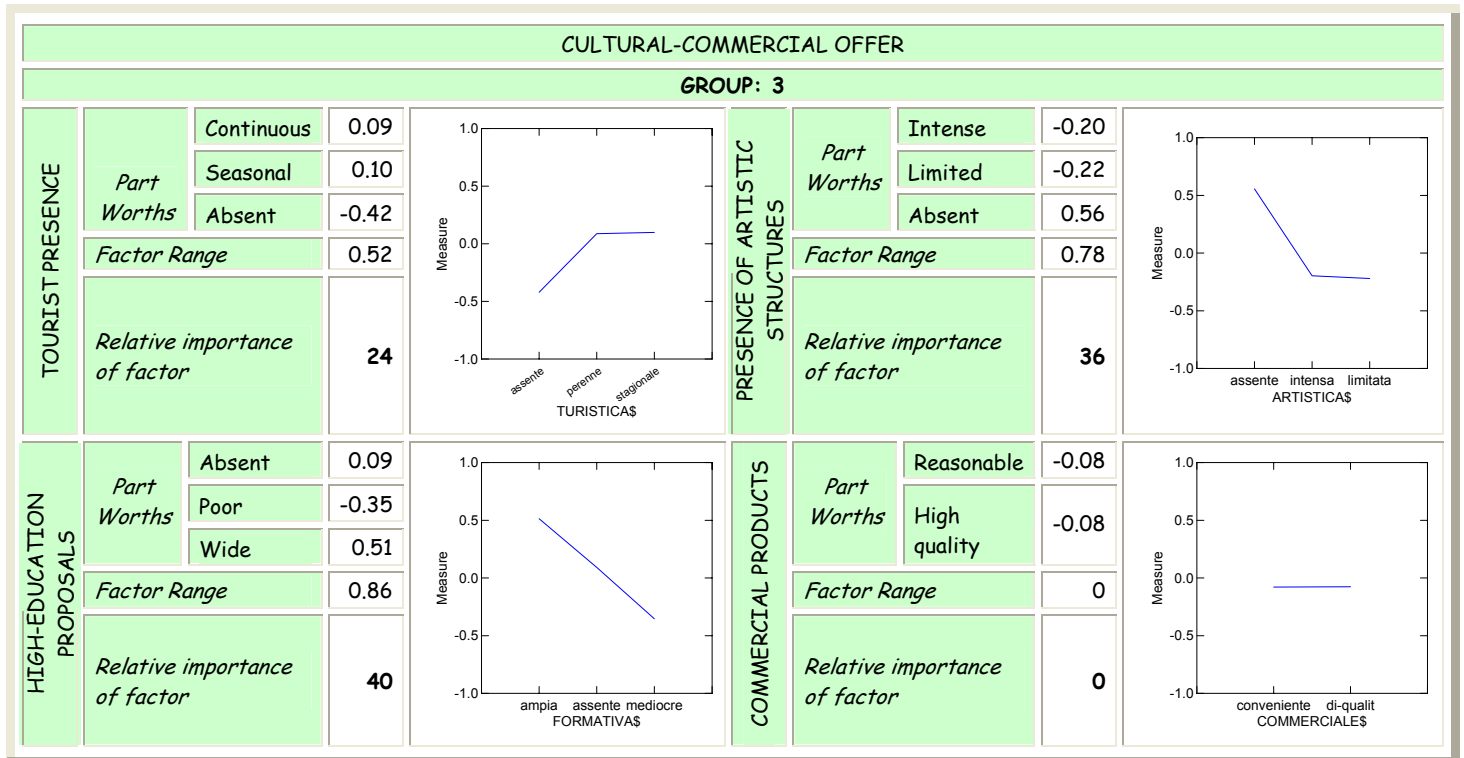
AStrIS 4 – THE IMPORTANCE OF QUALITY-OF-LIFE DIMENSIONS IN CITIZENS' PREFERENCES: AN EXPERIMENTAL APPLICATION OF CONJOINT ANALYSIS

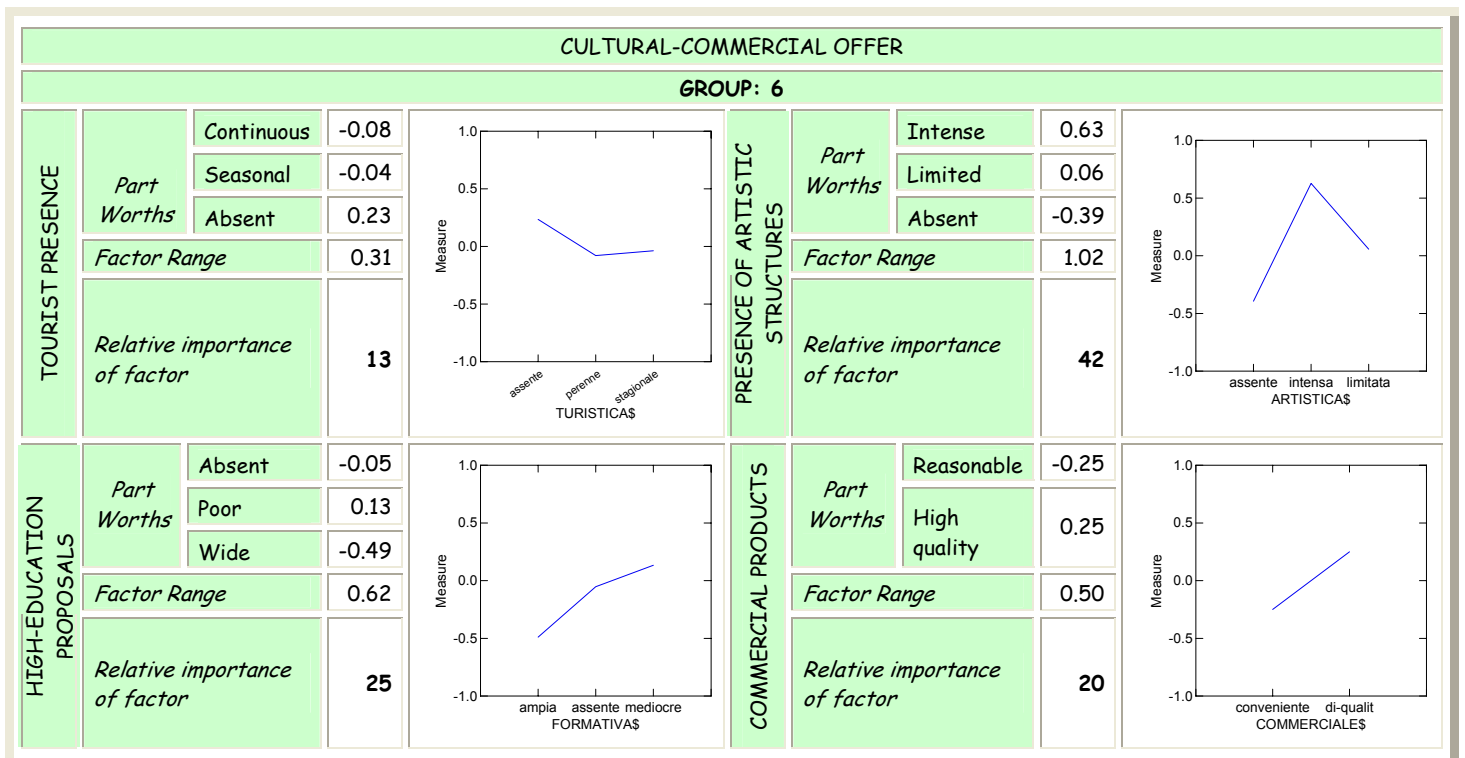
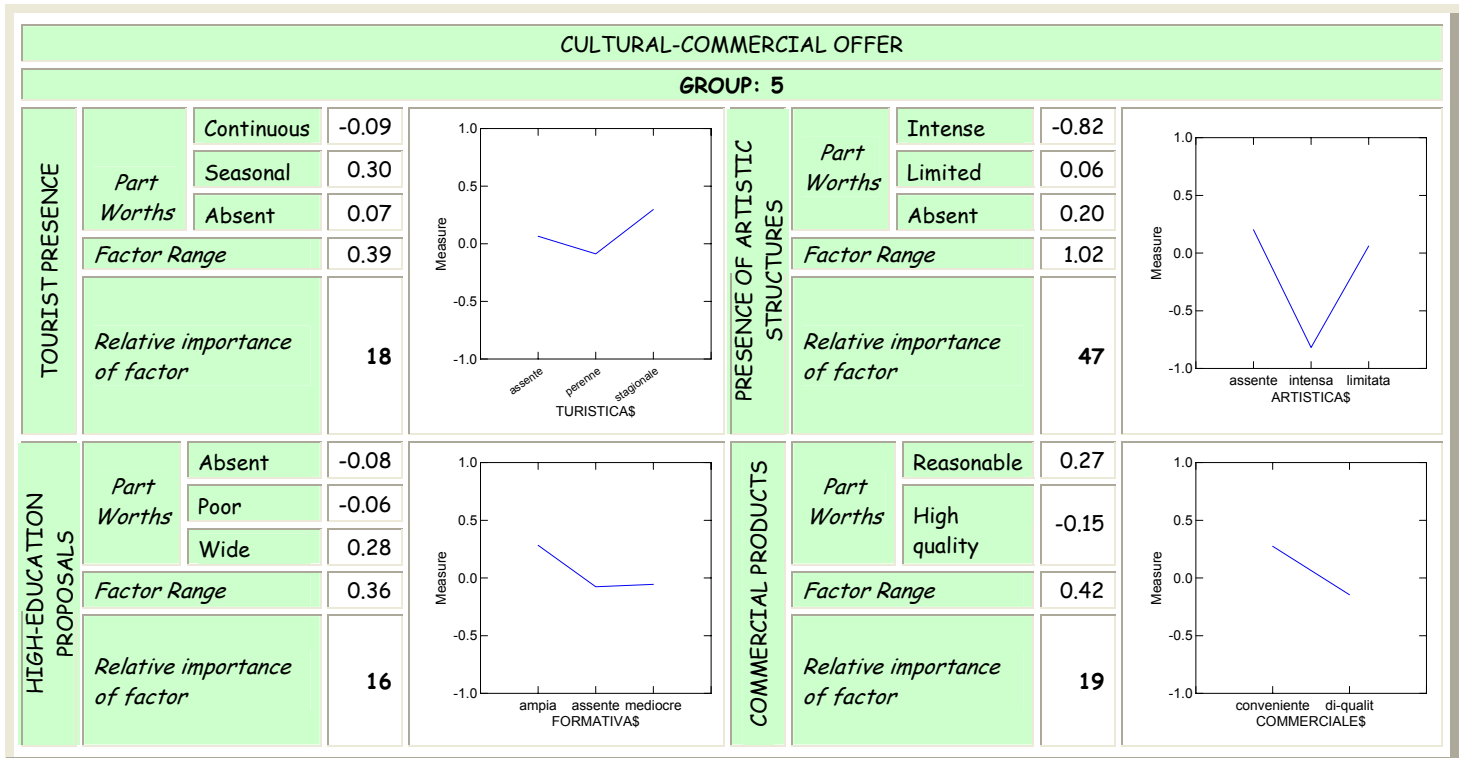


## C.4 AMBIT: THE CULTURAL-COMMERCIAL OFFER



AStrIS 4 – THE IMPORTANCE OF QUALITY-OF-LIFE DIMENSIONS IN CITIZENS' PREFERENCES: AN EXPERIMENTAL APPLICATION OF CONJOINT ANALYSIS





## ***D. THE DEFINITION OF SOME SYNTHETICAL INDEXES***

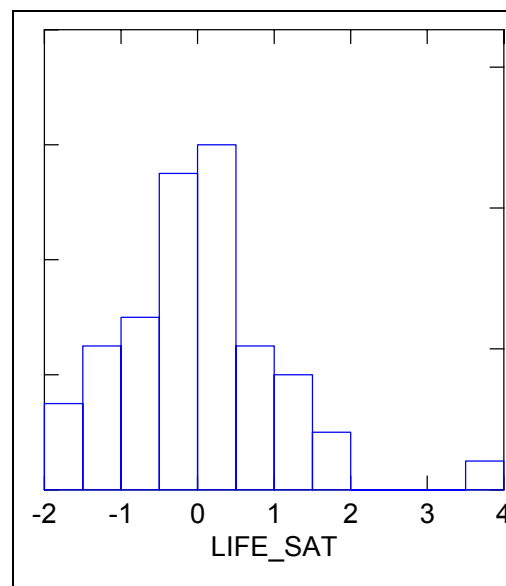
To order to carry out the defined analyses and to interpret the results of the conjoined analysis, the synthesis of the information collected through the questionnaire was performed; the synthesis procedure allowed the creation of some indicators.

### **Indicator of individual life satisfaction (LIFE\_SAT)**

Such indicator synthesizes the following variables:

- Cognitive component of subjective well-being: general life satisfaction (11-points satisfaction scale with 11 points and positive polarity);
- Affective component of subjective well-being: happiness (Faces scale by Andrews-Whitey, with a negative polarity);
- Perception of the future (graphic scale with 7 points and positive polarity);
- Self-esteem, measured through the multi-item scale by Rosemberg yielding a score with a positive polarity.

Principal component analysis yielded a unique dimension for the four variables; a score for each respondent was calculated through the factor score. The frequency distribution of such indicator (positive polarity) turned out the following:



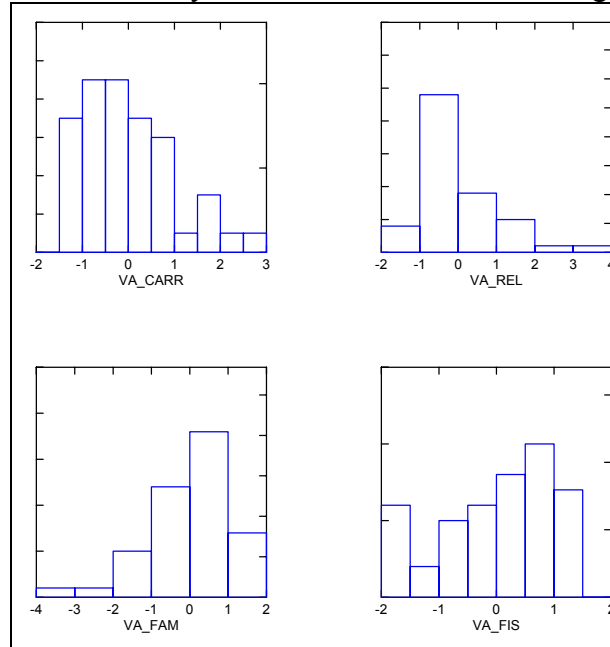
### **Indicators of importance attributed to life ambits**

A group of items investigated the level of importance that each respondent attributes to different ambits of life (negative polarity). Principal component analysis identified four general ambits (72% of the explained variance); through factor scores, four indicators were calculated (with positive polarity), in particular:

- *importance attributed to the working life and the career* (VA\_CARR): this component includes items concerning the importance attributed to the gain (item 36), to the career (item 37), to the ideals (item 43, with negative weight);
- *importance attributed to human relations* (VA\_REL): this component includes items concerning the importance attributed to neighbourhood relations (item 39), to friendships (item 40), to the relation with the partner ( item 45, with negative weight);

- *importance attributed to the family life* (VA\_FAM): this component includes items concerning the importance attributed to the family (item 38) and to the economic independence (item 42, with negative weight);
- *importance attributed to the physique* (VA\_FIS): this component includes items concerning the importance attributed to the health (item 44, with negative weight) and to the physical aspect (item 41).

The frequency distributions of the four synthetic scores are the following (positive polarity):

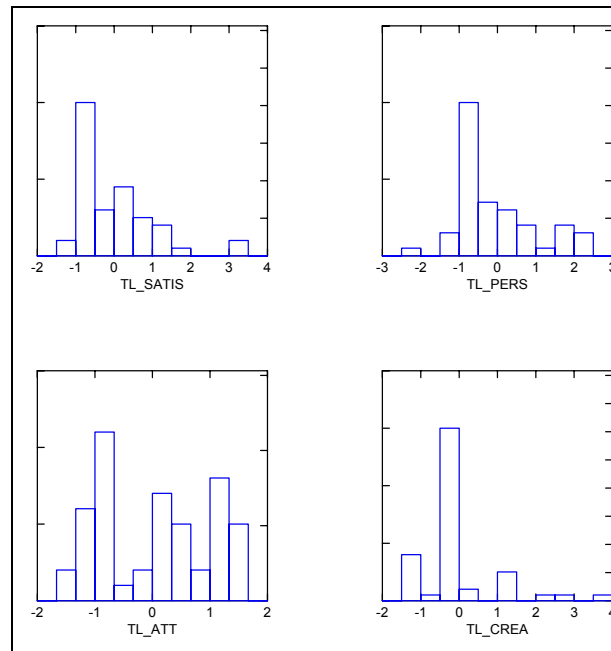


### Indicators of attitude towards spare-time activities

A group of items<sup>1</sup> investigated the subjective attitude towards the spare-time activities (negative polarity). Principal component analysis identified four ambits (64% of the explained variance); through factor scores, four indicators were calculated (with negative polarity), in particular:

- *spare-time activities are important for the level of subjective quality of life* (TL\_SATISF): this component includes the items 61 ("they develop the intellectual capacities"), 66 ("they increase life satisfaction"), 67 ("they improve quality of life") and 68 ("they help to express personal feelings");
- *spare-time activities are important for the psycho-physical health* (TL\_PERS): this component includes the items 62 ("they help to increase the individual self-esteem") and 69 ("they contribute to relax and to decrease the stress");
- *spare-time activities are important for the improvement of capacity to have relationships* (TL\_ATT): this component includes the items 64 ("they help to reduce racist behaviours") and 65 ("they contribute to the reduce violent behaviours");
- *spare-time activities are important for the individual creativity* (TL\_CREA): this component includes items 60 ("they develop and improve creativity") and 63 ("they contribute to the well-being").

<sup>1</sup> One item belonging to this group was excluded from the analysis since it turned out to be a constant (all the respondents believe that spare-time activities encourage the socialization).

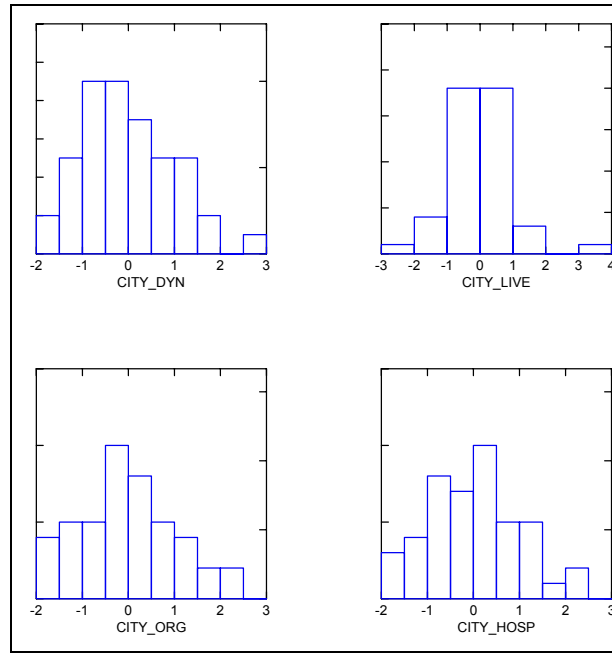


### Indicators of image and evaluation of city

The semantic differential approach allowed to explore the image and the evaluation that the respondents have about their town. Principal component analysis of the 21 couples of bipolar adjectives yielded four dimensions (68% of the explained variance); through factor scores, four indicators were calculated (with negative polarity), in particular:

- *level of dynamism of the city* (CITY\_DYN): this component includes the following adjectives, "stimulating-depressing" (item 82), "dynamic-static" (item 83), "strong-weak" (item 90), "interesting-meaningless" (item 91), "beautiful-ugly" (item 97), "pleasant-unpleasant" (item 99) and "positive-negative" (item 100);
- *level of liveability of the city* (CITY\_LIVE): this component includes the following adjectives, "clam-excited" (item 88), "comfortable-uncomfortable" (item 92), "tidy-chaotic" (item 93), "concret-abstract" (item 94), "silent-noisy" (item 96), "secure-dangerous" (item 98) and "relaxing-stressful" (item 101);
- *level of organization and innovation of the city* (CITY\_ORG): this component includes the following adjectives, "innovating-traditionalist" (item 84), "organized-disorganized" (item 85), "young-old" (item 87), "fair-unfair" (item 95) and "open-close" (item 102);
- *level of hospitality of the city* (CITY\_HOSP): this component includes the following adjectives "cheap-expensive" (item 86) and "hospitable-inhospitable" (item 89).





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